THE MOSQUITOES OF GUATEMALA

THEIR IDENTIFICATION, DISTRIBUTION AND BIONOMICS

With Keys to Adult Females and Larvae

In English and Spanish*

by

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INTRODUCTION

A knowledge of the taxa belonging to the Culicidae is important to any country because the family contains vectors of disease agents and nuisance species which constitute public health problems. No prior attempt has been made to assemble the information on the mosquito species which occur in the Central American country of Guatemala, although Heinemann & Belkin (1977a) did publish a list of 72 species or species groups present in their collection records. This report includes a historical review, systematic index and new additions to the Guatemala fauna. Identification keys in English and Spanish to all taxa, distribution records within Guatemala, and comments on the bionomics of each species are also covered.

HISTORICAL REVIEW

Three general references deal with the total culicid fauna of Guatemala, i.e., Howard, Dyar & Knab (1912-1917), Dyar (1928) and Lane (1953). Many changes in nomenclature and the addition of new species make these publications obsolete. For example, 10 species known to occur in Guatemala have been described since Lane's monograph (1953) on Neotropical Culicidae, i.e., *Ae. guatemala* Berlin, 1969a; *Ae. guerrero* Berlin, 1969a; *Ae. daryi* Schick, 1970; *Ae. impostor* Schick, 1970; *Ae. sandrae* Zavortink, 1972; *Cx. pedroi* Sirivanakarn & Belkin, 1980; *Cx. erethyzonfer* Galindo & Blanton, 1954; *De. belkini* Adames, 1971; *Hg. aeritinctus* Galindo & Trapido, 1967; *Ma. dyari* Belkin, Heinemann & Page, 1970. Also the older references do not include changes in the nomenclature of supraspecific taxonomic groups which have occurred in recent years. Furthermore, these publications contain keys to many more species than are found in Guatemala, making identifications difficult for the scientist who is mainly concerned with Guatemalan species.

The presence of mosquitoborne human diseases in Guatemala emphasizes the necessity of preparing reliable keys for the identification of species involved in their transmission. Four such diseases are known to occur in the country: malaria, yellow fever, dengue fever and Venezuelan equine encephalitis (VEE). Their vectors and confirming references are as follows:

DISEASE	VECTORS	REFERENCE
Malaria	*An. albimanus* *An. pseudopunctipennis* *An. hectoris* (?)	May (1961)
Yellow Fever	*Ae. aegypti*	PASB (1955) WHO (1972)
	Hg. equinus *Hg. mesodentatus* *Sa. chloropterus*	Rodaniche & Galindo (1957)
Dengue Fever	*Ae. aegypti*	U.S. Dept. HEW/ CDC (1977) SNEM/Guatemala (1978)
Venezuelan Equine Encephalitis	*Ps. confinnis* *Ma. titillans* *Cx. nigripalpus* *Ae. taeniorhynchus*	Sudia et al. (1971) Hinman et al. (1971) Sudia & Newhouse (1975)
	Cx. taeniopus (=Cx. opisthopus Komp*)*	Cupp et al. (1979)

A provisional list of the mosquito fauna of Guatemala was compiled including all species reported in the literature. It was based mainly on information gathered from Knight & Stone (1977), Knight (1978) and Heinemann & Belkin (1977a). During the study it was augumented by species found to be new to Guatemala.

The construction of the keys was accomplished in 2 steps: first, the basic information was compiled from Howard et al. (1915, 1917), Dyar (1928), Lane (1953), Carpenter & LaCasse (1955), Belkin et al. (1970) and Mattingly (1971). Secondly, for specific accounts on the major genera we consulted the following: *Aedes* - Berlin (1969a), Schick (1970), Zavortink (1972), Arnell (1976); *Anopheles* - De León (1933, 1938, 1940), Komp (1940, 1942), Vargas & Martínez-Palacios (1956), Stojanovich et al. (1966), Zavortink (1970, 1973), Faran (1980), Faran & Linthicum (1981); *Culex* - Bohart (1948), Foote (1954), Bram (1967), Berlin (1969b), Valencia (1973), Berlin & Belkin (1980).

References useful for minor genera were: Galindo et al (1954), Belkin et al. (1965, 1971), Zavortink (1968, 1979 a,b), Adames (1971) and Arnell (1973).

A special problem was encountered with the genus *Trichoprosopon* Theobald. Zavortink (1979a,b) has divided it into 4 genera, i.e., *Johnbelkinia* Zavortink, *Runchomyia* Theobald, *Shannoniana* Lane & Cerqueira and *Trichoprosopon* Theobald (s.str.). Each has representatives in the Guatemalan fauna. The revision of the last 3 genera has not yet been published (Zavortink, 1979a). Partial descriptions of 3 undescribed

species of *Shannoniana* were provided by Zavortink (1981, in litt.) and are included in the adult female key as species 1, species 2 and species 3.

METHODOLOGY

Field work included visits to many departments of Guatemala to collect adults and immature stages in as many different habitats as possible. The methods for collecting followed Belkin et al. (1967). Adults were captured with CDC miniature light traps (Sudia & Chamberlain, 1962; Johnston et al., 1973), and collections were made from human attractants. Much of the material was reared individually and mounted according to Belkin et al.(1967) and Darsie & Ramos (1969). Detailed notes were recorded on the bionomics and distribution of each species.

After preparation, the keys were tested with material from the U.S. National Museum and with specimens obtained during the project; then they were modified as needed, especially when species new to Guatemala were encountered.

RESULTS

A total of 124 species of mosquitoes (plus 3 undescribed species of *Shannoniana*) is now known to occur in Guatemala. They are listed in the systematic index in Table 1 below. During the project, 14 of the 22 departments in the country were visited and specimens from 5 others were made available to us. A total of 928 adults (827 females and 101 males) and 272 larvae was collected and mounted. In all, 177 individual rearings were completed. Among these collections were representatives of 84 species in 17 genera, including 17 new country records; see Table 1.

SYSTEMATIC INDEX

Table 1 is the systematic index of the species of the family Culicidae present in Guatemala, listed in alphabetical order. The family is interpreted here as in Knight & Stone (1977) and the supraspecific categories follow those given by Knight & Stone (loc. cit.) and Knight (1978). The exception in *Trichoprosopon* (s. lat.) as mentioned above. The species recorded herein are conceptualized as described in the latest publication which deals with each one. Two species listed by Knight & Stone (loc. cit.) as occurring in Guatemala, *Ae. tortilis* (Theobald) and *Ae. condolescens* (Dyar & Knab) have been deleted from the fauna by Arnell (1976).

Four species, *Cx. panocossa* Dyar, *Cx. paracrybda* Komp, *Cx. sardinerae* Fox and *Cx. trifidus* Dyar, are included here by permission of S. Sirivanakarn and are from his unpublished records of collections made in Guatemala. Comments on the systematics of certain Guatemalan species will be given in the section on distribution and bionomics below.

In composing the faunal list we encountered a number of species whose distribution indicated that they might occur in Guatemala. So, 13 extralimital species, listed in Table 2 below, were accepted and incorporated into the identification keys. Therefore, a total of 140 species is included in the keys.

TABLE 1

SYSTEMATIC INDEX OF THE CULICIDAE OF GUATEMALA

AEDEOMYIA Theobald, 1901
Subgen. *Aedeomyia* Theobald, 1901
squamipennis (Lynch-Arribalzaga, 1878)
AEDES Meigen, 1818
Subgen. *Aedimorphus* Theobald, 1903
vexans Meigen, 1850
Subgen. *Howardina* Theobald, 1903
**allotecnon* Kumm, Komp & Ruiz, 1940
guatemala Berlin, 1969
**guerrero* Berlin, 1969
quadrivittatus (Coquillett, 1902)
Subgen. *Ochlerotatus* Lynch-Arribalzaga (1891)
angustivittatus Dyar & Knab, 1907
epactius Dyar & Knab, 1908
**euplocamus* Dyar & Knab, 1906
fulvus (Wiedemann, 1928)
**hastatus* Dyar, 1922
scapularis (Rondani, 1848)
serratus (Theobald, 1901)
taeniorhynchus (Wiedemann, 1821)
tormentor Dyar & Knab, 1906
Subgen. *Protomacleaya* Theobald, 1907
daryi Schick, 1970
homoeopus Dyar, 1922
impostor Schick, 1970
insolitus (Coquillett, 1906)
podographicus Dyar & Knab, 1906
sandrae Zavortink, 1972
Subgen. *Stegomyia* Theobald, 1901
aegypti (Linnaeus, 1762)
ANOPHELES Meigen, 1818
Subgen. *Anopheles* Meigen, 1818
apicimacula Dyar & Knab, 1906
crucians Wiedemann, 1828
eiseni Coquillett, 1902
gabaldoni Vargas, 1941
hectoris Giaquinto-Mira, 1931
intermedius (Peryassu, 1908)
parapunctipennis var. *guatemalensis* De León, 1938
pseudopunctipennis Theobald, 1901
punctimacula Dyar & Knab, 1906
vestitipennis Dyar & Knab, 1906
xelajuensis De León, 1938
Subgen. *Kertezia* Theobald, 1905
neivai Howard, Dyar & Knab, 1912
Subgen. *Nyssorhynchus* Blanchard, 1902
albimanus Wiedemann, 1820
allopha (Peryassu, 1921)
argyritarsis Robineau-Desvoidy, 1827
darlingi Root, 1926
strodei Root, 1926
CHAGASIA Cruz, 1906
bathana (Dyar, 1928)
COQUILLETTIDIA Dyar, 1905
Subgen. *Rhynchotaenia* Brethes, 1910
nigricans (Coquillett, 1904)
venezuelensis (Theobald, 1912)
CULEX Linnaeus, 1758
Subgen. *Anoedioporpa* Dyar, 1923
conservator Dyar & Knab, 1906
restrictor Dyar & Knab, 1906
Subgen. *Carrollia* Lutz, 1905
bihaicola Dyar & Nuñez-Tovar, 1927
metempsytus Dyar, 1921
Subgen. *Culex* Linnaeus, 1758
**chidesteri* Dyar, 1921
corniger Theobald, 1903
coronator Dyar & Knab, 1906
**declarator* Dyar & Knab, 1906
**inflictus* Theobald, 1901
interrogator Dyar & Knab, 1906
mollis Dyar & Knab, 1906
nigripalpus Theobald, 1901
ousqua Dyar, 1918
peus Speiser, 1904
pinarocampa Dyar & Knab, 1908
quinquefasciatus Say, 1823
**stenolepis* Dyar & Knab, 1908
thriambus Dyar, 1921
usquatus Dyar, 1918
Subgen. *Lutzia* Theobald, 1903
bigoti Bellardi, 1862
Subgen. *Melanoconion* Theobald, 1903
**bastagarius* Theobald, 1906
conspirator Dyar & Knab, 1906
eastor Dyar, 1920
**educator* Dyar & Knab, 1906
erraticus (Dyar & Knab, 1906)
iolambdis Dyar, 1918
**panocossa* Dyar, 1923

* First report from Guatemala

TABLE 1 (cont'd.)

paracrybda Komp, 1936
**pedroi* Sirivanakarn & Belkin, 1980
pilosus (Dyar & Knab, 1906)
**sardinerae* Fox, 1953
taeniopus Dyar & Knab, 1907
**trifidus* Dyar, 1921
Subgen. *Micraedes* Coquillett, 1906
erethyzonfer Galindo & Blanton, 1954
Subgen. *Neoculex* Dyar, 1905
derivator Dyar & Knab, 1906
CULISETA Felt, 1904
Subgen. *Culiseta* Felt, 1904
particeps (Adams, 1903)
DEINOCERITES Theobald, 1901
**belkini* Adames, 1971
cancer Theobald, 1901
epitedeus (Knab, 1907)
pseudes Dyar & Knab, 1909
HAEMAGOGUS Williston, 1896
Subgen. *Haemagogus* Williston, 1896
aeritinctus Galindo & Trapido, 1967
anastasionis Dyar, 1921
equinus Theobald, 1903
mesodentatus Komp & Kumm, 1938
regalis Dyar & Knab, 1906
JOHNBELKINIA Zavortink, 1979
ulopus (Dyar & Knab, 1906)
LIMATUS Theobald, 1901
durhamii Theobald, 1901
MANSONIA Blanchard, 1901
Subgen. *Mansonia* Blanchard, 1901
dyari Belkin, Heinemann & Page, 1970
titillans (Walker, 1848)
ORTHOPODOMYIA Theobald, 1904
kummi Edwards, 1939
PSOROPHORA Robineau-Desvoidy, 1827
Subgen. *Grabhamia* Theobald, 1903
confinnis (Lynch-Arribalzaga, 1891)
Subgen. *Janthinosoma* Lynch-Arribalzaga, 1891
albipes (Theobald, 1907)
champerico (Dyar & Knab, 1906)
ferox (Von Humboldt, 1819)
lutzii (Theobald, 1901)
varipes (Coquillett, 1904)
Subgen. *Psorophora* Robineau-Desvoidy, 1827
ciliata (Fabricius, 1794)
howardii Coquillett, 1901
RUNCHOMYIA Theobald, 1903
Subgen. *Ctenogoeldia* Edwards, 1930
magna (Theobald, 1905)
Subgen. *Isostomyia* Coquillett, 1906
espini Martini, 1914
SABETHES Robineau-Desvoidy, 1827
Subgen. *Sabethes* Robineau-Desvoidy, 1827
cyaneus (Fabricius, 1805)
tarsopus Dyar & Knab, 1908
Subgen. *Sabethoides* Theobald, 1903
chloropterus (Von Humboldt, 1819)
SHANNONIANA Lane & Cerqueira, 1942
moralesi (Dyar & Knab, 1919)
species 1
species 2
species 3
TOXORHYNCHITES Theobald, 1901
Subgen. *Lynchiella* Lahille, 1904
grandiosus (Williston, 1900)
haemorrhoidalis superbus (Dyar & Knab, 1906)
theobaldi (Dyar & Knab, 1906)
TRICHOPROSOPON Theobald, 1901
digitatum (Rondani, 1848)
URANOTAENIA Lynch-Arribalzaga, 1891
Subgen. *Uranotaenia* Lynch-Arribalzaga, 1891
coatzacoalcos Dyar & Knab, 1906
**geometrica* Theobald, 1901
lowii Theobald, 1901
orthodoxa Dyar, 1921
pulcherrima Lynch-Arribalzaga, 1891
socialis Theobald, 1901
WYEOMYIA Theobald, 1901
Subgen. *Dendromyia* Theobald, 1903
aporonoma Dyar & Knab, 1906
chalcocephala Dyar & Knab, 1906
pseudopecten Dyar & Knab, 1906
Subgen. *Wyeomyia* Theobald, 1901
abebela Dyar & Knab, 1908
arthrostigma (Lutz, 1905)
celaenocephala Dyar & Knab, 1906
guatemala Dyar & Knab, 1906
melanopus Dyar, 1919

TABLE 2
EXTRALIMITAL SPECIES INCLUDED IN THE IDENTIFICATION KEYS - THEIR DISTRIBUTION BY COUNTRY

SPECIES	COUNTRY					
	Mexico	El Salvador	Honduras	Nicaragua	Costa Rica	Panama
Ae. (How.) sexlineatus (Theobald)[1]	X		X			X
Ae. (Och.) bimaculatus (Coquillett)[2]	X	X				
Ae. (Och.) fluviatilis (Lutz)[3]	X		X	X		X
An. (Ano.) neomaculipalpus Curry[4]	X	X		X	X	X
An. (Nys.) oswaldoi (Peryassú)[4]					X	X
Cx. (Lut.) allostigma (Howard et al.)[5]	X	X		X	X	X
Cx. (Mel.) chrysonotum Dyar & Knab[5]	X		X	X	X	X
Cx. (Mel.) elevator Dyar & Knab[5]	X	X	X	X	X	X
De. howardi Belkin & Hogue[6]	X	X		X		
Li. asulleptus (Theobald)[5]			X	X	X	X
Ps. (Pso.) cilipes (Fabricius)[5]	X		X		X	X
Ps. (Pso.) lineata (Von Humboldt)[5]	X		X			X
Wy. (Wyo.) hemisagnosta Dyar & Knab[5]		X			X	X

For further details consult: [1]Berlin (1969a), [2]Carpenter & La Casse (1955), [3]Zavortink (1972), [4]Komp (1942), [5]Lane (1953), [6]Adames (1971).

IDENTIFICATION OF THE MOSQUITOES OF GUATEMALA

There follow dichotomous keys for the recognition of 140 species of Central American Culicidae, 124 of which are known to occur in Guatemala (see Table 1 above). The keys employ the morphological terminology advocated by Harbach & Knight (1980). A brief resume of morphology precedes each set of keys. These have been written in both English and Spanish for the convenience of use in either language. The keys are arranged with generic keys first, followed by the subgeneric, where applicable, and specific keys in alphabetical order by genus. Those in English precede those in Spanish.

Unpublished descriptions of the adult females of 3 as yet unnamed species of *Shannoniana* were made available by T.J. Zavortink and those of larvae of *Cx. panocossa*, *Cx. paracrybda* and *Cx. trifidus*, by S. Sirivanakarn. It is interesting to note that the females of only 2 species are unknown while larvae of 11 species are either unknown or poorly described. Obviously more work is needed on the immature stages for the fauna treated here. The species involved are listed in footnotes in the appropriate keys.

MORPHOLOGY OF ADULT FEMALE

In this discussion only those structures used in the identification keys will be described although some others not described are shown in the illustrations. For further details, consult Harbach & Knight (1980).

Head: The head is ovoid, with a large proportion occupied by the 2 compound eyes (CE). Five appendages are borne on the head (Fig. 1). The 2 antennae (A) are attached between the eyes and are composed of a flat segment, the scape, the cup-shaped pedicel, and 13-14 flagellomeres (Flm), the antennal segments. The single proboscis (P) is found on the ventroanterior aspect. It is covered by a scaled sheath, the labium, inside of which are the piercing stylets. On either side of its base are the 2 maxillary palpi (MPlp), made up of 5 palpomeres, or segments. The basal palpomeres may be small or rudimentary so that there may appear to be only 4 or fewer palpomeres. The dorsal aspect of the head consists of the anterior vertex and posterior occiput (Occ). Since there is no division between them, the dorsum is usually referred to as the occiput. The dorsal border of the eye along the vertex and occiput is termed the ocular line

Thorax: The thorax is subdivided into the pro-, meso- and metathorax. Important taxonomic characters are contained on the sclerites of the thorax. The mesothorax is greatly enlarged, while the pro- and metathorax are correspondingly reduced. On the anteriormost part of the thorax, the prothorax is composed of the antepronotum (Ap) dorsally, directly below, the proepisternum (Ps) and posterolaterally, the postpronotum (Ppn); see Fig. 3.

The dorsum of the mesothorax consists of the large sclerite, the scutum (Scu, Fig. 2). Slight anterolateral depressions on the scutum are called the fossae (SF), while the antealar (AnA) and supraalar (SaA) refer to those areas just in front of and just dorsal to the bases of the wings, respectively. The prescutellar area (PrA) is located posteromedially and is usually devoid of scales. The scutum frequently bears rows of setae; the median row consists of the acrostichal setae (AcS), and the rows on either side of it are the dorsocentral setae (DS).

Posterior to the scutum is the thin transverse sclerite, the scutellum (Stm), which is evenly rounded in most anophelines and trilobed in culicines The caudalmost dorsal sclerite of the mesothorax is the mesopostnotum (Mpn),

a dome-shaped plate.

The lateral aspect of the thorax is termed the pleuron, and the individual plates, the pleural sclerites. Each sclerite, or separate area thereof, may bear setae and/or scales which will have the corresponding name, e.g., setae on the postspiracular area are called postspiracular setae.

The mesothoracic pleural sclerites are the following (Fig. 3): just posterior to the postpronotum is the anterior mesanepisternum (AMas), bearing the mesothoracic spiracle (MS) which usually appears as a hole. Dorsoanterior to the spiracle is a small triangular area, the prespiracular area (PsA), and posteriorly to the spiracle is the larger postspiracular area (PA). Posteriorly are the posterior mesanepisternum (PMas) dorsally and the mesokatepisternum (Mks) ventrally. They usually appear as a single pear-shaped unit. Setae on the posterior mesanepisternum are called the prealar setae and those on the ventral part, the upper and lower mesokatepisternal setae (MkSU, MkSL). Continuing posteriorly, a rather rectangular plate, the mesanepimeron (Mam), is found, ventral to which is the small triangular mesomeron (Msm). Just anterior to the wing base is a small sclerite, the paratergite (Pa).

Leg: The mosquito leg is composed of 5 principal parts, proceeding from the body distally, they are: coxa (C), the segment attached to the body, trochanter (Tr), femur (Fe), tibia (Ti) and tarsus (Ta). The tarsus is subdivided into 5 tarsomeres, the terminal fifth segment usually bearing 2 claws (Cl) (Fig. 5).

Wing: The wings are composed of thickened lines, called veins, and membranes stretched among them, cells. There are 6 longitudinal veins in mosquito wings which with their branches bear scales. Their names and those of the cells are shown in Fig. 4A. In the wings of some genera, especially *Anopheles*, the pattern of dark and pale scales form spots which have names; see Fig. 4B.

Abdomen: The abdomen consists of 10 segments of which the first 7 are usually visible. Their structure is similar, composed of a dorsal tergum (Te, Fig. 6) and a ventral sternum (S). Those sclerites are connected by elastic tissue, the pleural membrane (PMe). Abdominal tergum I has a lateral portion, known as the laterotergite (Lt) and tergum VII may bear an apical row of spine-like setae, or spiniforms. The final 3 segments are telescoped within the abdomen, but terminal lobes, called cerci (Ce), are usually visible.

MORFOLOGIA DE LAS HEMBRAS ADULTAS

Se describen a continuación las estructuras morfológicas utilizadas en las claves. Para obtener información adicional sobre morfología consúltese el libro de Harbach y Knight (1980).

Cabeza: La cabeza tiene forma ovoide, gran parte de la misma ocupada por los ojos compuestos (CE). Existen cinco apéndices cefálicos (Fig. 1). Dos antenas (A) que se originan en medio de los ojos, compuestas de un segmento basal o escapo, el pedicelo (en forma de taza) y trece a catorce flagelómeros (Flm) o segmentos antenales. La proboscis (P), en posición ventroanterior, está cubierta por el labio. Esta estructura, en forma de funda escamosa, protege los estiletes punzantes. Los dos palpos maxilares (MPlp) nacen a ambos lados de la proboscis y están compuestos de cinco segmentos o palpómeros. El segmento basal puede estar poco desarrollado, de manera que los apéndices aparentan tener menos de 5 palpómeros. El occipucio (Occ), en posición dorsal, es el nombre global de vértice (anterior) y el occipucio (posterior), ya que es difícil distinguir las dos estructuras como regiones separadas. El límite dorsal del ojo compuesto, a lo largo del vértice y el occipucio recibe el nombre de linea ocular.

Tórax: Muchos caracteres de importancia se encuentran en los escleritos torácicos. La región se subdivide en pro, meso y metatórax, siendo el mesotórax la región mas desarrollada. El protórax posee tres estructuras de importancia: el antepronoto (Ap) en posición dorsal, el proepisterno (Ps) ventral al antepronoto y el postpronoto (Ppn) en posición posterolateral (Fig. 3).

El dorso del mesotórax posee las siguientes estructuras: el escuto (Scu, Fig. 2), un esclerito grande con dos depresiones anterolaterales llamadas fosas (SF); las áreas antealares (AnA) y supraalares (SaA), respectivamente en posición anterior y dorsal con respecto a las bases de las alas; el área preescutelar (PrA) posterior al escuto y generalmente sin cubierta de escamas. Frecuentemente el escuto presenta filas de cerdas, la fila media recibe el nombre de cerdas acrosticales (AcS), las filas laterales, cerdas dorsocentrales (DS).

El escutelo (Stm), un esclerito delgado posterior al escuto, tiene forma redondeada en la mayoría de anofelinos y trilobulada en los culicinos. El último esclerito visible en vista dorsal es el mesopostnoto (Mpn), en forma de domo.

Lateralmente, los escleritos torácicos reciben el nombre conjunto de pleura (o escleritos pleurales). Cada uno puede presentar una cubierta de cerdas y/o escamas que reciben el nombre del esclerito correspondiente. Ejemplo: a las cerdas del área postespiracular se les llama cerdas postespiraculares.

Los escleritos pleurales de importancia mencionados en orden de anterior a posterior son (ver Fig. 3): el mesanepisterno anterior (AMas) detrás del postpronoto, que posee el espirículo mesotorácico (MS) visible como un orificio; el área preespiracular (PsA) en form de triángulo colocada dorsoanteriormente al espirículo, y posteriormente, el área postespiracular (PA) un poco mas grande; el mesanepisterno posterior (PMas) y el mesokatepisterno (Mks) respectivamente en posición dorsal y ventral, generalmente parecen formar una única estructura en form de pera; las cerdas de la primera región son las cerdas prealares (PaS) y las de la región ventral, cerdas mesokatepisternales (MkSU, MkSL); el mesanepímero (Mam) en forma rectangular y el mesómero (Msm) en forma de triángulo pequeño debajo del mesanepímero; el paratergito (Pa) colocado anteriormente a la base del ala.

Pata: Las patas del mosquito nacen del tórax y se componen de cinco partes: coxa (C), el segmento mas próximo al cuerpo, trocanter (Tr), fémur (Fe), tibia (Ti) y tarso (Ta). El tarso se subdivide en cinco segmentos o tarsómeros, el quinto posee usualmente dos garras (Cl) (Fig. 5).

Ala: Las alas se componen de células membranosas rodeadas por engrosamientos llamados venas. Los mosquitos poseen seis venas longitudinales ramificadas cubiertas con escamas; cada célula recibe el nombre de la vena anterior a ella. Los nombres se ilustran en la Fig. 4A. Las alas de algunos generos (especialmente *Anopheles*) están densamente cubiertas con escamas oscuras y pálidas que forman patrones de manchas y reciben nombres especiales, ver Fig. 4B.

Abdómen: El abdómen posee diez segmentos con estructura similar. Cada uno posee un tergo dorsal (Te, Fig. 6), un esternón (S) en posición ventral y la membrana pleural (PMe) de tejido elastico uniendo ambos escleritos. El laterotergito (Lt) es una parte del primer tergo abdominal. El séptimo tergo abdominal puede presentar a veces una fila de cerdas espinosas en el borde apical llamadas espiniformes. Los últimos tres segmentos están retraídos dentro del abdómen; sin embargo los lóbulos terminales, llamados cercos (Ce), son generalmente visibles.

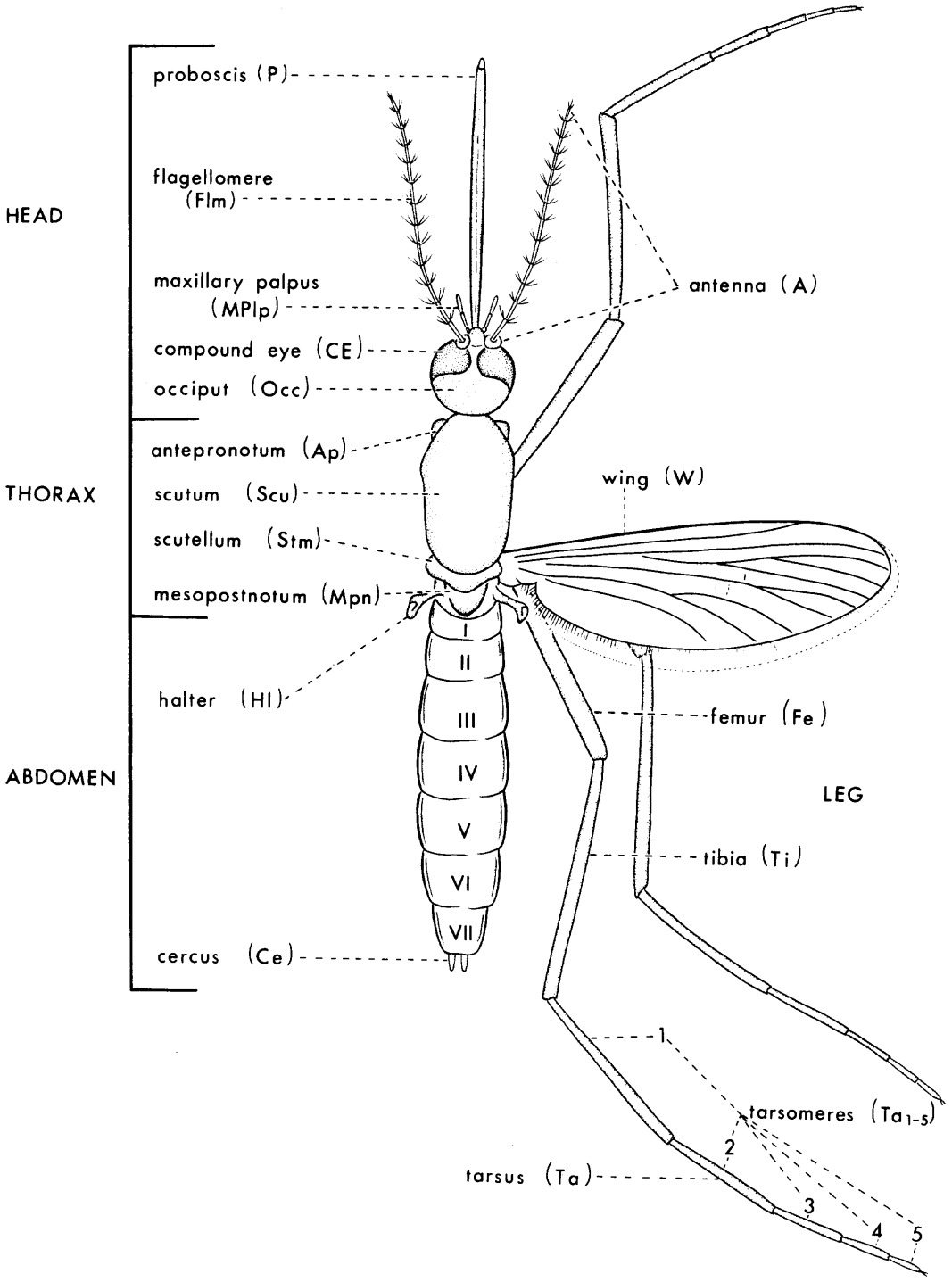

Figure 1. Dorsal view of adult female (Vista dorsal de la hembra adulta). Head - cabeza, thorax - tórax, abdomen - abdómen, leg - pata; A - antena, Ap - antepronoto, CE - ojo compuesto, CE - cerco, Fe - fémur, Flm - flagelómero, Hl - halter, MPlp - palpo maxilar, Mpn - mesopostnoto, Occ - occipucio, P - proboscis, Scu - escuto, Stm - escutelo, Ta - tarso, Ta_{1-5} - tarsómeros, Ti - tibia, W - ala.

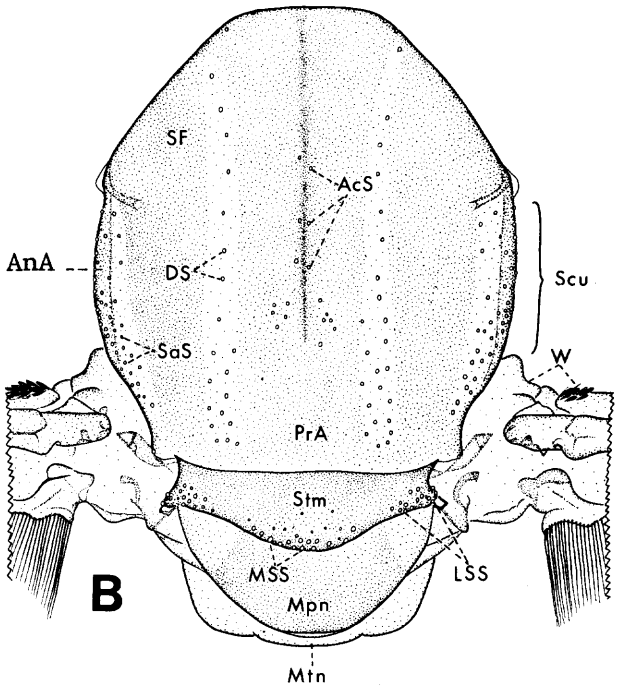

Figure 2. Dorsal view of thorax (Vista dorsal del tórax).

AcS - acrostichal setae; cerdas acrosticales
AnA - antealar area; área antealar
DS - dorsocentral setae; cerdas dorsocentrales
LSS - lateral scutellar setae; cerdas escutelares laterales
Mpn - mesopostnotum; mesopostnoto
MSS - median scutellar setae; cerdas escutelares medias
Mtn - metanotum; metanoto
PrA - prescutelar area; área preescutelar
SaA - supraalar area; área supraalar
SaS - supraalar setae; cerdas supraalares
Scu - scutum; escuto
SF - scutal fossa; fosa de escuto
Stm - scutellum; escutelo
W - wing; ala

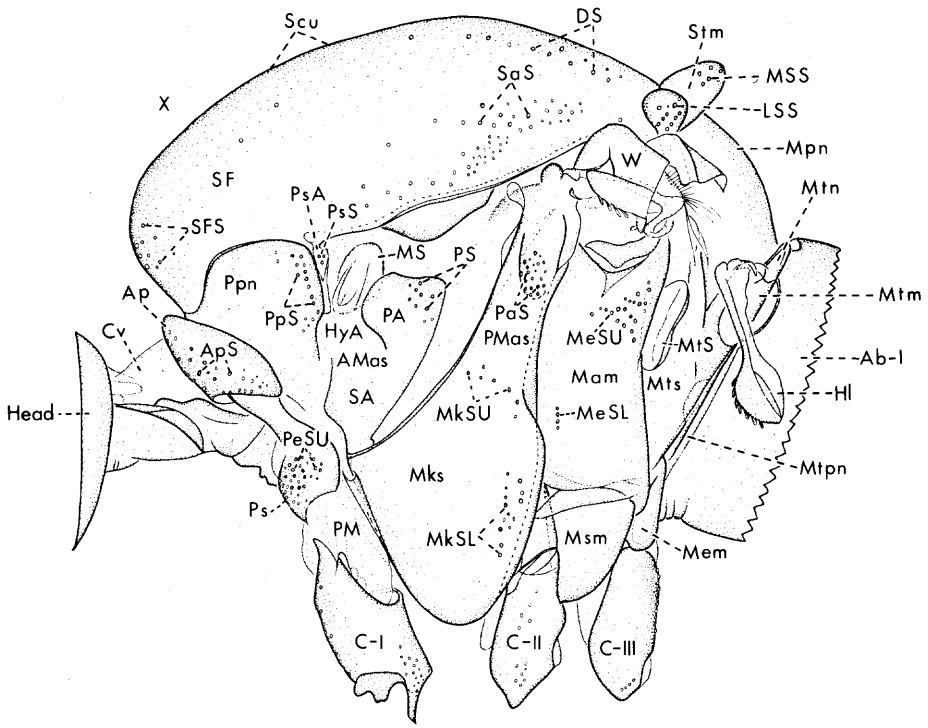

Figure 3.

Figure 3. Lateral view of thorax (Vista lateral del tórax)

Ab-I - abdominal segment I; segmento abdominal I
AMas - anterior mesanepisternum; mesanepisterno anterior
Ap - antepronotum; antepronoto
ApS - antepronotal setae; cerdas antepronotales
C-I - coxa I; coxa delantera
C-II - coxa II; coxa media
C-III - coxa III; coxa posterior
Cv - cervix; cervix
DS - dorsocentral setae; cerdas dorsocentrales
Hl - halter; haltere
HyA - hypostigmal area; área hipostigmal
LSS - lateral scutellar setae; cerdas escutelares laterales
Mam - mesanepimeron; mesanepímero
Mem - metameron; metámero
MeSL - lower mesanepimeral setae; cerdas mesanepimerales inferiores
MeSU - upper mesanepimeral setae; cerdas mesanepimerales superiores
Mks - mesokatepisternum; mesokatepisterno
MkSL - lower mesokatepisternal setae; cerdas mesokatepisternales inferiores
MkSU - upper mesokatepisternal setae; cerdas mesokatepisternales superiores
Mpn - mesopostnotum; mesopostnoto
MS - mesothoracic spiracle; espiráculo mesotorácico
Msm - mesomeron; mesómero
MSS - median scutellar setae; cerdas escutelares medias
Mtm - metepimeron; metepímero
Mtn - metanotum; metanoto
Mtpn - metapostnotum; metapostnoto
MtS - metathoracic spiracle; espiráculo metatorácico
Mts - metepisternum; metepisterno
PA - postspiracular area; área postespiracular
Pa - paratergite; paratergito
PaS - prealar setae; cerdas prealares
PeSU - upper proepisternal setae; cerdas proepisternales superiores
PM - postprocoxal membrane; membrana postprocoxal
PMas - posterior mesanepisternum; mesanepisterno posterior
Ppn - postpronotum; postpronoto
PpS - postpronotal setae; cerdas postpronotales
PS - postspiracular setae; cerdas postespiraculares
Ps - proepisternum; proepisterno
PsA -prespiracular area; área prespiracular
SA - subspiracular area; área subespiracular
SaS - supraalar setae; cerdas supraalares
Scu - scutum; escuto
SF - scutal fossa; fosa escutal
SFS - scutal fossal setae; cerdas de la fosa del escuto
Stm - scutellum; escutelo
W - wing; ala

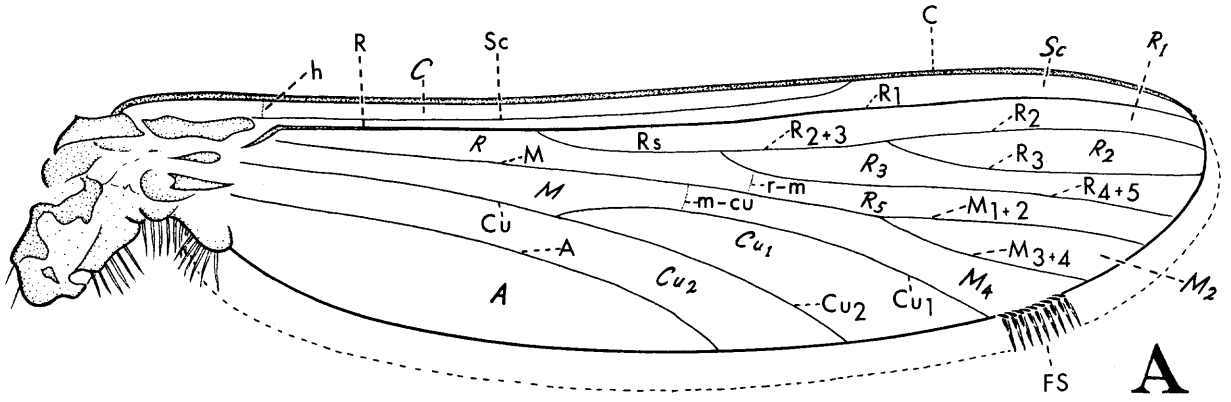

Figure 4. Mosquito wing (Ala de mosquito). A. Venation by Comstock-Needham system (Venación por sistema de Comstock-Needham)

A - anal vein; vena anal
A - anal cell; célula anal
C - costal vein; vena costa
C - costal cell; célula costa
Cu - cubital vein; vena cubital
Cu_1 - vein Cu_1; vena Cu_1
Cu_1 - cell Cu_1; célula Cu_1
Cu_2 - vein Cu_2; vena Cu_2
Cu_2 - cell Cu_2; célula Cu_2
FS - fringe scales; franja de escamas
h - humeral crossvein; vena transversal humeral
M - medial vein; vena medial
M - medial cell; célula medial
M_{1+2} - vein M_{1+2}; vena M_{1+2}
M_2 - cell M_2; célula M_2
M_{3+4} - vein M_{3+4}; vena M_{3+4}
M_4 - cell M_4; célula M_4
m-cu - mediocubital crossvein; vena transversal mediocubital
R - radial vein; vena radial
R - radial cell; célula radial
R_1 - vein R_1; vena R_1
R_1 - cell R_1; célula R_1
R_2 - vein R_2; vena R_2
R_2 - cell R_2; célula R_2
R_{2+3} - vein R_{2+3}; vena R_{2+3}
R_3 - vein R_3; vena R_3
R_3 - cell R_3; célula R_3
R_{4+5} - vein R_{4+5}; vena R_{4+5}
R_5 - cell R_5; célula R_5
r-m - radiomedial crossvein; vena transversal radiomedial
R_s - radial sector vein; vena sector radial
Sc - subcostal vein; vena subcosta
Sc - subcostal cell; célula subcosta

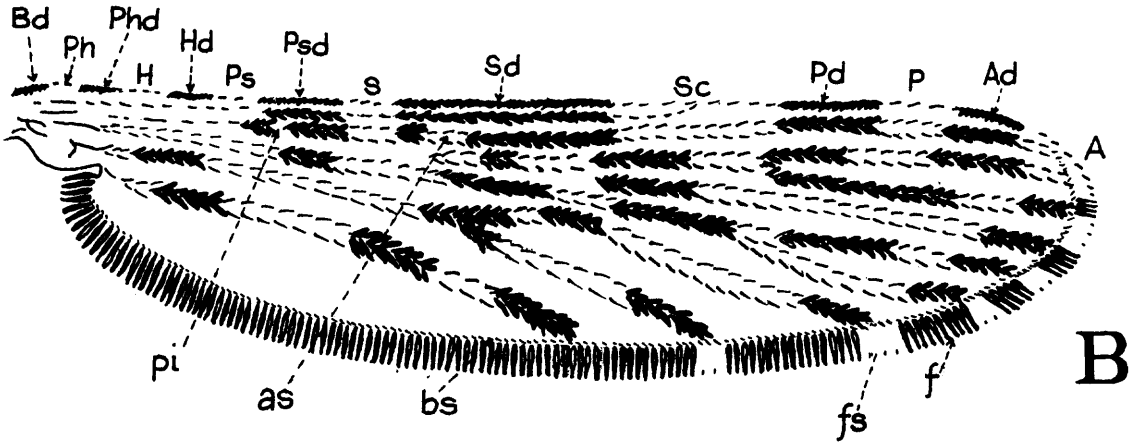

Figure 4. Mosquito Wing (Ala de mosquito). B. Markings on the anopheline wing (Manchas en el ala de anofelinos)

A - apical pale spot; mancha apical pálida
Ad - apical dark spot; mancha apical oscura
as - accessory sector pale spot; mancha sector pálida accesoria
Bd - basal dark spot; mancha basal oscura
bs - border scales; escamas del borde
f - fringe scales; escamas de la franja
fs - fringe spot; mancha de la franja
H - humeral pale spot; mancha humeral pálida
Hd - humeral dark spot; mancha humeral oscura
P - preapical pale spot; mancha preapical pálida
Pd - preapical dark spot; mancha preapical oscura
Ph - prehumeral pale spot; mancha prehumeral pálida
Phd - prehumeral dark spot; mancha prehumeral oscura
pi - pale interruption; interrupción pálida
Ps - presector pale spot; mancha presector pálida
Psd - presector dark spot; mancha presector oscura
S - sector pale spot; mancha sector pálida
Sc - subcostal pale spot; mancha subcostal pálida
Sd - sector dark spot; mancha sector oscura

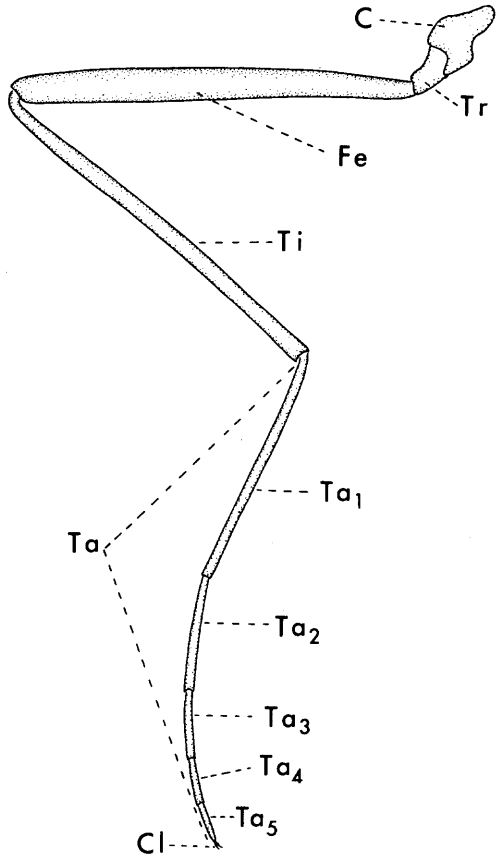

Figure 5. Mosquito leg (Pata de mosquito). C - coxa, coxa; Cl - claw garra; Fe - femur, fémur; Ta - tarsus, tarso; Ta_{1-5} - tarsomere $_{1-5}$, tarsómero$_{1-5}$; Ti - tibia, tibia; Tr - trochanter, trocanter.

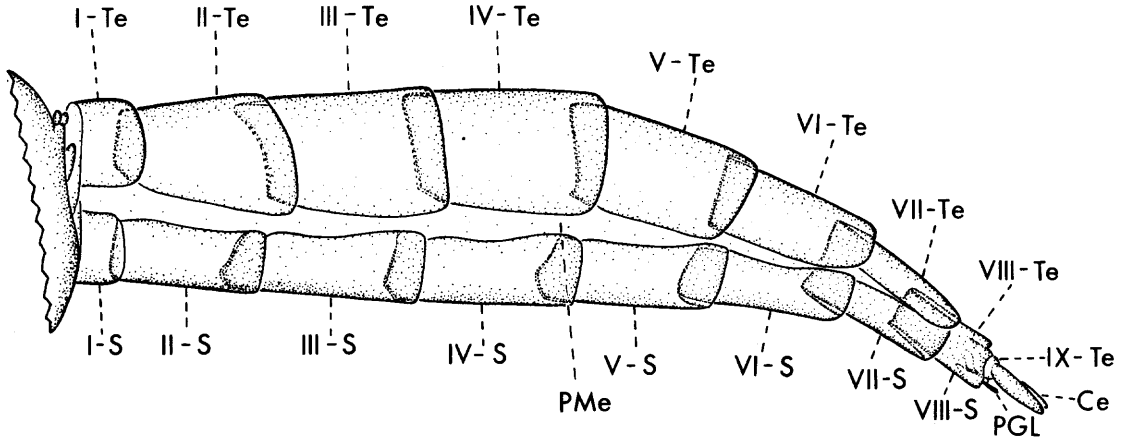

Figure 6. Lateral view of abdomen (Vista lateral del abdómen). Ce - cercus, cerco; Lt - laterotergite, laterotergito; PGL - postgenital lobe, lóbulo postgenital; PMe - pleural membrane, membrana pleural; S - sternum, esternón; Te - tergum, tergo.

KEYS TO THE ADULT FEMALE MOSQUITOES OF GUATEMALA

KEY TO GENERA

1. Proboscis strongly recurved; posterior edge of wing emarginated just beyond tip of vein Cu_2 . . . . . *Toxorhynchites*
Proboscis not recurved and posterior edge of wing straight or only slightly emarginated 2

2(1). Palpi about as long as proboscis; abdomen with sterna and usually terga wholly or largely devoid of scales 3
Palpi much shorter than proboscis; abdomen with terga and sterna densely and uniformly covered with scales 4

3(2). Scutellum trilobed, with setae in 3 distinct groups; 2 prominent lateral tufts of long spatulate scales just anterior to wing bases . . . . . *Chagasia bathana*
Scutellum evenly rounded and setae evenly distributed; without tufts of spatulate scales anterior to wing bases. . . . *Anopheles*

4(2). Cell R_2 of wing always shorter than vein R_{2+3}; apex of anal vein ending before fork of veins Cu_1 and Cu_2; thorax usually with lines of bluish scales . . . . . *Uranotaenia*
Cell R_2 at least as long as vein R_{2+3}; or if not (*Haemagogus*), then apex of anal vein ending distal to fork of Cu_1 and Cu_2; thorax without bluish scales 5

5(4). Mesopostnotum always with long setae, and sometimes with scales; base of hindcoxa usually in line with base of mesomeron or slightly above it; mesomeron very small 6
Mesopostnotum without setae or with 2 very small ones in posterior part; base of hindcoxa distinctly ventral to a larger mesomeron 12

6(5). Prespiracular area with broad scales only, without setae; hind tarsus with only 1 claw . . . . . *Limatus*
Prespiracular area with 1 or more setae; hindtarsus with 2 claws 7

7(6). Antepronotal lobes small, well separated; occiput with line of conspicuous dark erect scales posteriorly 8
Antepronotal lobes large and approaching at middorsal line; occiput without line of dark erect scales posteriorly, scales flat 11

8(7). Proboscis 0.85-1.20 length of forefemur; row of lower mesokatepisternal setae extending dorsad to above the ventral border of mesanepimeron 9
Proboscis 1.20-1.40 length of forefemur; row of lower mesokatepisternal setae usually not extending dorsad to ventral border of mesanepimeron 10

9(8). Hindtibia without postmedian light scaled band; laterotergite of abdominal segment I without scales basad and sparsely scaled distad, its ventral margin visible; postprocoxal membrane without scales . . . . . *Trichoprosopon digitatum*
Hindtibia with broad complete or incomplete postmedian light scaled band; laterotergite densely scaled, its lower margin hidden; postprocoxal membrane with scales . . . . . *Shannoniana*

10(8). Mid- and hindtarsi partially pale-scaled; scutal scales moderately broad and flat; scales of vertex and occiput with brilliant silver and azure blue reflections . *Johnbelkinia ulopus*
Mid- and hindtarsi dark-scaled; scutal scales narrow and curved OR scales of vertex and occiput without silver reflections and with only weak to moderate green or blue reflections . . . . . *Runchomyia*

11(7). Prealar setae absent; scutum covered with flat metallic colored scales with bright irridescent reflections; midlegs often with tibiotarsal "paddles" of erect scales . . . . . *Sabethes*
Prealar setae present; scutum usually dark-scaled, without metallic colored scales; midlegs without "paddles" . . . *Wyeomyia*

12(5). Scutum without visible setae on disc, scales smooth and with metallic color; antepronotal lobes enlarged and approaching middorsal line . . . . . *Haemagogus*
Scutum with at least prescutellar setae well developed; scutal scalation various but not smooth and metallic colored; antepronotal lobes small 13

13(12). Postspiracular setae present 14
Postspiracular setae absent 17

14(13). Plume scales on dorsal surface of wing veins R_2 and R_3 very broad; apex of abdomen blunt 15
Plume scales on dorsal surface of wing veins R_2 and R_3 narrow; apex of abdomen more or less pointed 16

15(14). Femora with conspicuous preapical pale-scaled band; wings mostly dark-scaled . . . . . *Coquillettidia*
Femora marked with dark and pale scales, but without definite preapical pale band; wings speckled with dark and pale scales . . . . . *Mansonia*

16(14). Prespiracular setae present; bands or patches of pale scales apical in position on abdominal terga . . . . . *Psorophora*
Prespiracular setae absent; bands or patches of pale scales basal in position on abdominal terga . . . . . *Aedes*

17(13). Prespiracular setae present; base of subcostal vein with row of setae on ventral side . . . . . *Culiseta particeps*
Prespiracular setae absent; base of subcosta without row of setae on ventral side 18

18(17). Tarsomere 4 on fore- and midlegs short, no longer than wide; scutum with fine lines of white scales . . . . . *Orthopodomyia kummi*
Tarsomere 4 on fore- and midlegs longer than wide; scutum without fine lines of white scales, with other scale patterns. 19

19(18). Antenna with short, thick flagellomeres; midfemur with tuft of long scales . . . . . *Aedeomyia squamipennis*
Antenna with normal elongated flagellomeres; midfemur without tuft of long scales 20

20(19). Antenna much longer than proboscis; flagellomere 1 two or more times longer than flagellomere 2 . . . . . *Deinocerites*
Antenna about as long as proboscis; flagellomere 1 not much longer than flagellomere 2, if at all . . . . . *Culex*

KEY TO SPECIES OF GENUS *AEDES**

1. Scutum with 4 narrow light-scaled longitudinal lines; abdominal terga II-VII with basolateral silver-scaled patches; claws simple 21
Scutum and abdomen otherwise adorned with scales; claws toothed, at least on fore and midlegs 2

2(1). Hindtarsomeres all dark-scaled 3
Hindtarsomeres with some pale-scaled bands 12

3(2). Scutal integument yellow with posterolateral dark marks 4
Scutal integument brown or blackish 5

4(3). Thoracic pleuron with dark hypostigmal spot; abdominal terga yellow-scaled basally, dark-scaled apically . . . . . *fulvus*
Thoracic pleuron without dark hypostigmal spot; abdominal terga entirely yellow-scaled . . . . . *bimaculatus*

5(3). Midtarsomere 1 with broad basal pale-scaled band; inner posterior fossal area of scutum with conspicuous pale-scaled patch..*sandrae*
Midtarsomere 1 entirely dark-scaled, or at most, streaked with pale scales; fossal area of scutum either all dark-scaled, mostly or entirely pale-scaled, or with a midfossal pale scaled stripe 6

6(5). Scutum with scales uniformly colored OR with narrow to broad longitudinal lines of pale scales extending its entire length, broadly connected to scutellum 7
Scutum with large patch of light-colored scales not reaching scutellum, or if so only narrowly connected 11

7(6). Scutum uniformly covered with brown scales, sometimes with median yellowish scales not forming definite longitudinal line . . . . . (in part) *serratus*
Scutum with median longitudinal line of yellow, white or silver scales 8

*Female of *Ae. impostor* unknown.

8(7). Scutum with 2 submedian lines of yellow to white scales . . . . . *angustivittatus*
Scutum with single median line of yellow, white or silvery scales 9

9(8). Abdominal sterna entirely pale-scaled; lateral basal pale-scaled patches of abdominal terga IV-VII extending dorsally . *tormentor*
Abdominal sterna with apical dark-scaled bands; lateral basal pale scaled patches on IV-VII small, not extending dorsally . 10

10(9). Scales of median longitudinal line of scutum and midlobe of scutellum yellow to golden . . . . . (in part) *serratus*
Scales of median longitudinal line of scutum and midlobe of scutellum white to silvery . . . . . *hastatus*

11(6). Hindtibia and hindtarsomere 1 with conspicuous pale-scaled stripe on anterior surface, sometimes encircling tibia; abdomen usually with indistinct pale-scaled median longitudinal stripe on posterior terga . . . . . *scapularis*
Hindtibia and hindtarsomere 1 entirely dark-scaled; abdomen dark-scaled dorsally or with basomedian pale-scaled patches. *euplocamus*

12(2). Hindtarsomeres with apical and basal pale-scaled bands on at least 1 segment 13
Hindtarsomeres with basal pale-scaled bands only 19

13(12). Mid- and hindtarsomeres with broad silver-scaled band including apex of segment 1 and base of segment 2 14
Mid- and hindtarsomeres with narrow pale-scaled bands basally and apically on several tarsomeral joints 18

14(13). Hindfemur with complete broad dark-scaled basal band; silvery scales on supraalar area broadly reaching scutal suture . . . 15
Hindfemur with dark-scaled basal band incomplete, OR if complete then silvery scales on supraalar area not reaching scutal suture 16

15(14). Occiput with all appressed scales narrow and curved; mesanepimeron with scale patch not divided . . . . . *insolitus*
Occiput with area of broad appressed scales lateral to narrow curved scales of median line; mesanepimeron with scale patch usually divided into two . . . . . (in part) *homoeopus*

16(14). Acrostichal setae absent; midtarsomere 1 with median dark-scaled band usually incomplete, OR if complete then less than 0.3 length of segment. . . . . *podographicus*
Acrostichal setae present; midtarsomere 1 with median dark-scaled band usually complete and broad, 0.3 -0.6 length of segment. .17

17(16). Midfemur without pale-scaled spot at apex, OR when present narrow consisting of single row of apical scales; subspiracular scale patch absent . . . . . *daryi*
Midfemur with broad pale-scaled spot at apex extending basad of anterior subapical setae; subspiracular scales present or absent . . . . . (in part) *homoeopus*

18(13). Outer surface of hindcoxa with large patch of scales; paratergite and laterotergite bare; hindtarsomere 5 usually entirely pale-scaled dorsally . . . . . *epactius*
Outer surface of hindcoxa bare; paratergite and laterotergite usually scaled; hindtarsomere 5 entirely dark-scaled or with only small patch of pale scales . . . . . *fluviatilis*

19(12). Proboscis with pale-scaled band near middle . . . . *taeniorhynchus*
Proboscis without pale-scaled band near middle 20

20(19). Basal pale-scaled bands on abdominal terga bilobed posteriorly; hindtarsomeres with narrow basal pale-scaled bands . . . *vexans*
Basal pale-scaled bands on abdominal terga straight posteriorly; hindtarsomeres with broad basal pale-scaled bands . . . . *aegypti*

21(1). Midfemur without white or silvery spot or streak on anterior surface above ventral pale-scaled line . . . . . *quadrivittatus*
Midfemur with more or less distinct white or silvery spot or streak on anterior surface above ventral pale-scaled line . . 22

22(21). Antealar area with numerous dark bronzy scales below narrow supraalar golden-scaled line . . . . . *sexlineatus*
Antealar area with white, yellow or golden scales, lateral margin and supraalar lines united, no bronzy scales present. 23

23(22). Hindlegs with basal white bands only on tarsomeres 1 and 2 . . . . . *guatemala*
Hindlegs with basal white bands on tarsomeres 1-3 24

24(23). Postpronotum with broad, flat pale scales, except for narrow dorsal border of yellowish curved moderately broad scales; postspiracular scales usually present . . . . . *guerrero*
Postpronotum with narrow to moderately broad, yellowish curved scales except at ventroposterior angle where a few broad flat pale scales are present; postspiracular scales absent..*allotecnon*

KEY TO SPECIES OF GENUS *ANOPHELES*

1. Hindtarsomeres 2-5 with broad basal black-scaled bands; vein R_{4+5} usually with basal pale-scaled spot only (subgenus *Kerteszia*) . . . . . *neivai*
Hindtarsomeres 2-5 otherwise scaled, sometimes entirely dark-scaled; vein R_{4+5} dark-scaled, with several pale-scaled spots or largely pale-scaled 2

2(1). Hindtarsomeres entirely dark-scaled OR with some segments speckled with pale scales OR with pale-scaled bands at some joints (subgenus *Anopheles)* 3
Hindtarsomeres with part of 2 and all of 3,4,5 pale-scaled, with or without basal dark-scaled band on 5 (subgenus *Nyssorhynchus*) 14

3(2). Femur, tibia and tarsomeres of hindleg entirely dark-scaled OR with complete pale bands at some joints, not speckled 4
Femur, tibia and some tarsomeres speckled with pale scales, sometimes with multiple pale bands 9

4(3). Hindtibia with broad apical band or patch of pale scales; wing with dark scales, except for 1-2 pale spots at apex; anal vein entirely dark-scaled 5
Hindtibia without apical pale-scaled band or patch; wing with pale scales on various veins; anal vein with pale and dark scales 6

5(4). Palpi entirely dark-scaled . . . . . *xelajuensis*
Palpomeres 3,4 with pale-scaled bands, 5 entirely pale . . . *eiseni*

6(4). Costa dark-scaled, except for apical spot . . . . . *crucians*
Costa with 2 or more pale-scaled spots 7

7(6). Costa without prehumeral and humeral pale-scaled spots; anal vein with pale scales basally, dark scales apically. *pseudopunctipennis*
Costa with prehumeral and humeral pale spots; anal vein with 3 dark-scaled spots 8

8(7). Vein R_{4+5} with 2 dark-scaled spots; mid- and hindlegs with whitish scales on coxae, trochanters and basally on femora . . . . . *hectoris*
Vein R_{4+5} with 3 dark-scaled spots; mid- and hindlegs with yellowish scales on coxae, trochanters and basally on femora . . . . . *parapunctipennis* var. *guatemalensis*

9(3). Abdominal terga II-VII without prominent lateral scale tufts; vein R_{4+5} largely dark-scaled . . . . . *vestitipennis*
Abdominal terga II-VII with prominent lateral scale tufts; vein R_{4+5} largely pale-scaled 10

10(9). Palpi dark-scaled; scutum with but 1 dark spot in prescutellar area, or none . . . . . *gabaldoni*
Palpi with pale-scaled bands; scutum with 3 dark spots 11

11(10). Costa with 2 distinct dark spots; vein Cu with 2 basal dark-scaled spots, the remainder with pale scales . . *neomaculipalpus*
Costa with 3 distinct dark spots; vein Cu usually with a single basal dark-scaled spot or predominantly dark-scaled 12

12(11). Preapical dark spot smaller than sector dark spot; wing scales truncate at apex . . . . . *intermedius*
Preapical dark spot subequal in size to sector dark spot; wing scales rounded at apex 13

13(12). Veins Cu and Cu_2 predominantly pale-scaled; color of apical dark spot diffuse . . . . . *punctimacula*
Veins Cu and Cu_2 predominantly dark-scaled; color of apical dark spot intensely black . . . . . *apicimacula*

14(2). Hindtarsomere 5 with basal dark-scaled band 15
Hindtarsomere 5 entirely pale-scaled 17

15(14). Dark caudolateral scale tufts absent from abdominal segment II; palpomere 4 all dark-scaled or with yellow to golden brown scales on mediolateral surface, never white or cream-colored; foretarsomere 5 usually entirely dark-scaled . . . . . *albimanus*
Dark caudolateral scale tufts present on II; palpomere 4 with at least some white or cream scales on mediolateral surface; foretarsomere 5 variable 16

16(15). Hindtarsomere 2 with basal dark band usually less than 0.26 length of segment; costa with pale scales cream-colored. *.oswaldoi*
Hindtarsomere 2 with basal dark band 0.30 length of segment or greater; costa with pale scales white . . . . . *strodei*

17(14). Abdominal sternum I with 2 parallel longitudinal lines of pale scales; vein R_3 with pale scales at apex . . . . . *allopha*
Abdominal sternum I bare; vein R_3 with or without pale scales at apex 18

18(17). Anterior mesanepimeron with distinct patch of pale scales; costa with basal dark spot 4.0 longer than humeral pale spot; vein R_3 with 3 dark-scaled spots . . . . . *darlingi*
Anterior mesanepimeron bare; costa with basal dark spot at most equal in length to humeral pale spot; vein R_3 with 2 dark spots . . . . . *argyritarsis*

KEY TO SPECIES OF GENUS *COQUILLETTIDIA**

Tibiae dark on anterior surface except for preapical pale-scaled band . . . . . *nigricans*
Tibiae speckled with pale-scaled spots on anterior surface . . . . . *venezuelensis*

KEY TO SUBGENERA OF GENUS *CULEX***

1. Acrostichal setae well developed on disc of scutum 2
Acrostichal setae not developed except at extreme anterior end and/or near prescutellar area on scutum 6

2(1). Usually 6 or more lower mesanepimeral setae; all femora speckled with light-colored scales; costa with alternating brown- and yellow-scaled areas . . . . . *Lutzia*
Usually 1 or 2, rarely 3, lower mesanepimeral setae; femora not conspicuously speckled; costa without anternate brown- and yellow-scaled areas 3

*Key adapted from Belkin et al. (1970).
**Key adapted from Berlin & Belkin (1980).

3(2). Abdominal terga with apical lateral patches . . . . . *Neoculex (derivator)*
Abdominal terga with basal pale bands or lateral patches, or terga entirely dark-scaled 4

4(3). Mesokatepisternum with distinct scale patches, if not present or only a few scales, then decumbent scales on occiput coppery-colored and pleuron mostly brown . . . . . *Culex*
Mesokatepisternum at most with few scales along setae; decumbent scales on occiput whitish; pleuron all or mostly yellow-colored 5

5(4). Pleural integument uniformly pale to yellowish; sterna I-VI with band of dark scales apically . . . . . (in part) *Anoedioporpa (restrictor)*
Pleural integument mostly pale to yellowish but brown on postpronotum and lower mesokatepisternum; sterna I-VI at most with few dark scales apically . . . . . *Micraedes (erethyzonfer)*

6(1). Abdominal terga with iridescent basolateral markings . . . *Carrollia*
Abdominal terga completely dark-scaled or with non-iridescent pale-scaled markings 7

7(6). Occiput with at least a line of broad decumbent scales along ocular line, usually all decumbent scales broad . . . . . *Melanoconion*
Decumbent scales of occiput narrow, even along ocular line . . . . . (in part) *Anoedioporpa (conservator)*

KEY TO SPECIES OF SUBGENUS *CARROLLIA**

Abdominal sterna uniformly pale-scaled . . . . . *bihaicola*
Abdominal sterna IV-VI with conspicuous apical dark-scaled bands . . . . . *metempsytus*

KEY TO SPECIES OF SUBGENUS *CULEX*

1. At least some tarsomeres with pale-scaled bands 2
Tarsomeres entirely dark-scaled 9

2(1). Proboscis with band of pale scales 3
Proboscis dark-scaled or with pale scales ventrally, not completely ringed 4

*Key adapted from Valencia (1973).

3(2). Palpi with pale scales at apex; sterna with oval-shaped median patch of dark scales . . . . . *peus*
Palpi entirely dark-scaled; sterna with broad dark-scaled apical band . . . . . (in part) *corniger*

4(2). Hindtarsomeres with narrow basal pale-scaled bands only. . *declarator mollis*
Hindtarsomeres with basal and apical pale-scaled bands 5

5(4). Hindtarsomere 5 entirely pale-scaled 6
Hindtarsomere 5 entirely, or at least partially, dark-scaled . . . 8

6(5). Abdominal sterna II-VI with triangular patches of dark scales . . . . . *thriambus*
Abdominal sterna II-VI with broad apical bands of dark scales . . . 7

7(6). Proboscis entirely dark-scaled . . . . . *pinarocampa*
Proboscis with pale scales ventrally . . . . . *stenolepis*

8(5). Abdominal sterna with broad dark-scaled apical bands . . . . . (in part) *corniger*
Abdominal sterna mostly or entirely pale-scaled . . . . . *coronator usquatus ousqua*

9(1). Abdominal terga with wide basal bands of pale scales on most segments 10
Abdominal terga without basal pale-scaled bands, or if present, narrow and sometimes on few segments only 11

10(9). Abdominal pale-scaled bands broadly rounded on posterior margin and constricted laterally, rather narrowly joining or entirely disconnected from, lateral patches; scales of scutum somewhat coarse, golden . . . . . *quinquefasciatus*
Abdominal pale-scaled bands with posterior margin nearly straight and broadly joining lateral patches, particularly on segments III-IV; scales of scutum fine, golden brown . . . . *interrogator*

11(9). Abdominal terga with narrow basal pale-scaled bands . . . *chidesteri*
Abdominal terga dark-scaled except for basolateral pale-scaled patches 12

12(11). Pleura with few or no scales, if present, rarely more than 5 or 6 in any single group; sterna pale-scaled . . . . . *nigripalpus*
Pleura with several patches of pale scales; sterna with apical bands of dark scales . . . . . *inflictus*

KEY TO SPECIES OF SUBGENUS *LUTZIA*

Subcostal pale spot on wing extending only to subcostal vein; vein Cu with dark scales extending from base to fork of Cu_1 and Cu_2 . . . . . *bigoti*

Subcostal pale spot on wing involves vein R_1 as well as costa and subcosta; vein Cu with dark scales confined to base. . .*allostigma*

KEY TO SPECIES OF SUBGENUS *MELANOCONION**

1. Hindtarsomeres 1-4 with pale-scaled bands at joints, 5 entirely pale-scaled 2

   Hindtarsomeres entirely dark-scaled 3

2(1). Dorsal corner of mesokatepisternum with distinct patch of scales; femora without pale-scaled knee spots . . . . . *taeniopus*

   Dorsal corner of mesokatepisternum without scales; femora with pale-scaled knee spots . . . . . *pedroi*

3(1). Scutum with golden scales on anterior 0.6, posterior part dark brown-scaled; broad central area of occiput predominantly covered with narrow linear or crescent-shaped scales. .*chrysonotum*

   Scutum entirely clothed with dark brown scales or nearly so; broad central area of occiput with wide ovate appressed scales or without scales 4

4(3). Mesanepimeron with scale patch in dorsal part . . . . . *erraticus*

   Mesanepimeron without scale patch in dorsal part 5

5(4). Ventral part of mesanepimeron with 4-5 hair-like to ligulate scales; mesanepimeron without pale-colored integument. . *iolambdis sardinerae*

   Ventral part of mesanepimeron without scales, integument light-colored or not 6

6(5). Part of mesokatepisternum below ventral border of mesanepimeron with width to length ratio of 1.2:1; mesanepimeron with light-colored integument covering dorsal 0.6 . . . . . *pilosus*

   Part of mesokatepisternum below ventral border of mesanepimeron with width to length ratio of 1:1; integument of mesanepimeron otherwise colored, dorsal 0.6 not entirely light-colored 7

7(6). Upper mesokatepisternum with patch of more than 3 broad scales . . . . . *trifidus*

   Upper mesokatepisternum with 3 or fewer broad scales 8

*The adult female of *Cx. paracrybda* is unknown. The assistance of S. Sirivanakarn in formulating this key is acknowledged.

8(7). Sterna of abdomen with narrow basal pale-scaled bands, broad dark-scaled apical bands; hindfemur with dark-scaled band apically. . 9
Sterna of abdomen entirely pale-scaled or with only apical spot of dark scales; hindfemur with pale ventral stripe extending to apex 11

9(8). Occiput with narrow anterior band of broad decumbent scales, slender yellowish scales posteriorly . . . . . *eastor*
Occiput with wide band of broad decumbent scales 10

10(9). Mesanepimeron with prominent pale-scaled spot . . . . . *bastagarius*
Mesanepimeron without pale-scaled spot . . . . . *conspirator*

11(8). Second seta of row on midcoxa larger than either first or third seta; cell R_2 7.0 longer than vein R_{2+3} . . . . . *educator*
Second seta of midcoxal row no longer than first and/or third seta; cell R_2 5.0 longer than vein R_{2+3} 12

12(11). Occiput with anterior border clothed with broad decumbent scales . . . . . *elevator*
Occiput with central anterior border clothed with long narrow scales . . . . . *panocossa*

KEY TO SPECIES OF
GENUS *DEINOCERITES**

1. Mesanepimeron without scales 2
Mesanepimeron with patch of translucent scales 3

2(1). Cercus with 2 long spatulate apical or subapical setae; tergum IX without setae (Atlantic Coast) . . . . . *cancer*
Cercus without long spatulate setae; tergum IX with 1-6 setae on each side (Pacific Coast) . . . . . *belkini*

3(1). Lower mesanepimeral seta absent; antenna with flagellomeres 1-4 markedly longer than others (Atlantic Coast) . . . . . *epitedeus*
Lower mesanepimeral seta present; antenna with only flagellomere 1 markedly longer than others (Pacific Coast) 4

4(3). Antenna exceeding proboscis at most from base of flagellomere 8; tergum IX usually without setae, rarely 1 . . . . . *pseudes*
Antenna longer, exceeding proboscis at least from basal 0.6 of flagellomere 7; tergum IX with 2 or more setae on each side . . . . . *howardi*

*Key adapted from Adames (1971).

KEY TO SPECIES OF GENUS *HAEMAGOGUS**

1. Midclaws and usually foreclaws with subbasal tooth; mesopostnotum bare; vein R_{2+3} usually greater than 0.5 of cell R_2 2
   Mid- and foreclaws simple; mesopostnotum with 2 small setae posteriorly; vein R_{2+3} usually less than 0.5 of cell R_2 4

2(1). Midleg with white or gray scales on outer surface of proximal 2 or 3 tarsomeres . . . . . *mesodentatus*
   Midtarsomeres entirely dark-scaled 3

3(2). Mid- and hindfemora with silver scales anteriorly at apex . . *equinus*
   Mid- and hindfemora without silver scales anteriorly at apex . . . . . *anastasionis*

4(1). Integument of apex of coxae, trochanters and bases of femora yellow; scales purple on vertex, light yellowish brown on occiput; scales of scutum copper-colored . . . . . *aeritinctus*
   Integument of coxae, trochanters and femora dark; scales of vertex and occiput blue to violet; scales of scutum bronze to green or blue, rarely copper-colored . . . . . *regalis*

KEY TO SPECIES OF GENUS *LIMATUS***

Abdominal terga with dark dorsal scales meeting pale ventral scales laterally in straight line pattern; scutellum with yellowish scales . . . . . *asulleptus*
Abdominal terga with dark dorsal scales meeting pale ventral scales laterally in incised pattern; scutellum with purple scales . . . . . *durhamii*

KEY TO SPECIES OF GENUS *MANSONIA****

Apex of abdominal tergum VII with row of short dark spiniforms; ventral surface of proboscis predominantly dark-scaled, lightly to moderately speckled with pale scales . . . . *titillans*
Apex of tergum VII without row of spiniforms; ventral surface of proboscis with broad pale-scaled stripe in middle 0.3 . . *dyari*

*Key adapted from Arnell (1973).
**Key adapted from Lane (1953).
***Key adapted from Belkin et al. (1970).

KEY TO SPECIES OF GENUS *PSOROPHORA**

1. Scutum with unscaled areas between acrostichal and dorsocentral setae and between prescutellar and supraalar setae; large species (subgenus *Psorophora*) 2
Scutum scaled between acrostichal and dorsocentral setae and between prescutellar and supraalar setae; medium to small species 5

2(1). Tarsi entirely dark-scaled 3
Hindtarsomeres 1-3 with basal pale-scaled bands or patches 4

3(2). Pleuron largely covered with pale scales . . . . . *cilipes*
Pleuron with pale scales in separated patches . . . . . *lineata*

4(2). Scutum with narrow median longitudinal stripe of golden scales; proboscis partially yellow-scaled in distal 0.5 . . . . . *ciliata*
Scutum with median longitudinal stripe of dark bronzy scales; proboscis entirely dark-scaled . . . . . *howardii*

5(1). Tarsal claws simple; tibiae speckled with pale scales; proboscis with distinct band of pale scales or with pale scales ventrally (subgenus *Grabhamia*) . . . . . *confinnis*
Tarsal claws toothed; tibiae uniformly dark-scaled; proboscis without pale scales (subgenus *Janthinosoma*) 6

6(5). Hindtarsomere 5 dark-scaled; hindtarsomere 4 mostly pale-scaled . . . . . *varipes*
Hindtarsomeres 4,5 pale-scaled 7

7(6). Scutum with mixed golden and dark bronzy scales in no definite pattern . . . . . *ferox*
Scutum with definite broad median longitudinal stripe of dark scales 8

8(7). Midlobe of scutellum with yellow scales . . . . . *champerico*
Midlobe of scutellum with dark scales 9

9(8). Proboscis distinctly longer than forefemur; pedicel of antenna with whitish scales . . . . . *albipes*
Proboscis as long as or shorter than forefemur; pedicel of antenna without scales . . . . . *lutzii*

KEY TO SPECIES OF GENUS *RUNCHOMYIA**

Abdominal terga with dark dorsal scales meeting pale ventral scales laterally more or less in straight line; midlobe of scutellum with silvery scales . . . . . *magna*
Abdominal terga with dark dorsal scales meeting pale ventral scales laterally in rounded incisions; midlobe of scutellum dark-scaled . . . . . *espini*

*Key adapted from Lane (1953).

KEY TO SPECIES OF
GENUS *SABETHES**

1. Proepisternal setae present; midtarsi with line of pale scales on external face; midlegs without "paddles" formed by long scales (subgenus *Sabethoides*) . . . . . *chloropterus*
Proepisternal setae absent; midtarsi without line of pale scales on external face; midlegs with "paddles" of long scales (subgenus *Sabethes*) 2

2(1). Tarsomeres marked with white scales . . . . . *tarsopus*
Tarsomeres entirely dark-scaled . . . . . *cyaneus*

KEY TO SPECIES OF
GENUS *SHANNONIANA***

1. Only hindtarsomere 5 with pale scales . . . . . *moralesi*
Hindtarsomeres either dark-scaled or with several segments marked with pale scales 2

2(1). All hindtarsomeres with pale scales; palpus long; postspiracular setae present . . . . . species 2
Hindtarsomeres entirely dark-scaled; palpus short; postspiracular setae absent 3

3(2). Antealar area with cream-colored scales; medium size . . . species 3
Antealar area with dark scales; small size . . . . . species 1

KEY TO SPECIES OF
GENUS *TOXORHYNCHITES**

1. Abdomen with red-colored tufts apicolaterally in segment VII . . . . . *haemorrhoidalis superbus*
Abdomen without such tufts on VII 2

2(1). Tibia entirely dark-scaled . . . . . *theobaldi*
Tibia mostly golden-scaled, most evident on mid- and hindlegs . . . . . *grandiosus*

KEY TO SPECIES OF
GENUS *URANOTAENIA****

1. Hindtarsomeres entirely dark-scaled 2
Some hindtarsomeres marked with white scales 3

*Key adapted from Lane (1953).
** Key formulated from information provided by Zavortink (1981, in litt.).
***Key adapted from Galindo et al. (1954).

2(1). Scutum with narrow median line of bluish scales; antepronotal lobes clothed with bluish scales; hindlegs with large apical spots of pale scales on femur and tibia; abdominal terga dark-scaled, except for narrow apical band of pale scales on III and V . . . . . *socialis*
Scutum without median line of bluish scales; antepronotal lobes with patch of silvery scales; hindlegs dark-scaled, without apical pale spots on femur and tibia; abdominal terga dark-scaled . . . . . *orthodoxa*

3(1). Hindtarsomeres with pale scales at least at base and apex 4
Hindtarsomeres with segments 1, 2 and part of 3 dark-scaled, remainder of tarsi entirely pale scaled 5

4(3). Hindtarsomeres 4 and 5 entirely white-scaled; scutum with median spot of bluish scales just before prescutellar area; large species . . . . . *geometrica*
Hindtarsomere 4 with median dark-scaled band, tarsomere 5 entirely pale-scaled; scutum with narrow median line of blue scales extending from anterior margin to prescutellar area; medium-sized species . . . . . *pulcherrima*

5(4). Line of blue scales above root of wing extend well beyond anterior margin of paratergite; scutal integument dark brown; medium-sized species . . . . . *coatzacoalcos*
Line of blue scales above root of wing not reaching level of anterior margin of paratergite; scutal integument yellow with broad median dark brown band and 2 large dark brown spots above roots of wings; small species . . . . . *lowii*

KEY TO SPECIES OF GENUS *WYEOMYIA**

1. Basal section of wing vein M with lateral anterior scales ligulate, and with appressed scales narrow, not wider than width of vein (subgenus *Wyeomyia*) 2
Basal section on vein M with lateral anterior scales broader, the appressed scales broad, or all broad and long, wider than width of vein (subgenus *Dendromyia*) 6

2(1). Antepronotal lobes with scales of blue violaceous metallic color and without white scales; ocular line dark-scaled..*celaenocephala*
Antepronotal lobes with or without metallic-colored scales, always with some pale scales; ocular line with at least some pale scales 3

3(2). At least some tarsomeres marked with pale scales 4
Tarsomeres entirely dark-scaled 5

4(3). Only hindtarsomeres marked with pale scales . . . . . *hemisagnosta*
Mid- or mid- and hindtarsomeres marked with pale scales. . *guatemala*

*Key adapted from Lane (1953).

5(3). Antenna as long as proboscis; femorotibial joints with pale-scaled spots; antepronotal dark scales without metallic color . . . . . *arthrostigma*

Antenna 0.5-0.75 as long as proboscis; without pale spots on femorotibial joints; antepronotal dark scales with metallic sheen . . . . . *abebela melanopus*

6(1). Hindtarsomeres only with pale scales; antepronotal lobes entirely golden-scaled, or tipped with golden scales. . *aporonoma*

Mid- or mid- and hindtarsomeres with pale scales; antepronotal lobes with other color pattern 7

7(6). Tarsomere 4 and 5 of midleg dark-scaled; median pale-scaled stripe on occiput . . . . . *pseudopecten*

Tarsomere 4 and 5 of midleg with pale scales in continuous line; occiput without median pale-scaled stripe . . . . . *chalcocephala*

CLAVE PARA LA IDENTIFICACION DE MOSQUITOS HEMBRAS ADULTAS DE GUATEMALA

CLAVE GENERICA

1. Proboscis curvada hacia abajo; borde posterior del ala cóncavo justo debajo del extremo de la vena Cu_2 . . . . . *Toxorhynchites*
Proboscis mas o menos recta; borde posterior del ala recto o ligeramente cóncavo 2

2(1). Palpos casi tan largos como proboscis; esternones y, generalmente tergos del abdómen con pocas escamas o totalmente sin ellas . . . 3
Palpos mucho mas cortos que proboscis; esternones y tergos con una cobertura de escamas densa y uniforme 4

3(2). Escutelo trilobulado con grupos de cerdas en cada lóbulo; dos penachos grandes de escamas largas y espatuladas colocados lateralmente enfrente de las bases de las alas. . .*Chagasia bathana*
Escutelo redondeado en forma pareja, cerdas distribuidas uniformemente; sin penachos enfrente de bases de las alas.*Anopheles*

4(2). Célula R_2 del ala siempre mas corta que vena R_{2+3}; ápice de la vena anal termina antes de la bifurcación de las venas Cu_1 y Cu_2; tórax generalmente con líneas de escamas azuladas . . . *Uranotaenia*
Célula R_2 por lo menos del mismo largo que vena R_{2+3}, si no (*Haemagogus*) ápice de la vena anal termina después de la bifurcación de Cu_1 and Cu_2; tórax sin escamas azuladas 5

5(4). Mesopostnoto siempre con cerdas largas, algunas veces con escamas; base de la coxa posterior usualmente alineada con base del mesómero o ligeramente arriba de éste; mesómero muy pequeño . . . 6
Mesopostnoto sin cerdas o con 2 muy pequeñas en la región posterior; base de la coxa posterior ventral a la base del mesómero; mesómero mas grande 12

6(5). Area prespiracular solamente con escamas anchas, sin cerdas; tarso posterior con una sola garra . . . . . *Limatus*
Area prespiracular con una o mas cerdas; tarso posterior con dos garras 7

7(6). Lóbulos antepronotales pequeños, bien separados entre si; occipucio con línea de escamas oscuras erectas posteriormente 8
Lóbulos antepronotales grandes, aproximándose a la línea mediodorsal; occipucio sin línea de escamas erectas 11

8(7). Longitud de proboscis 0.85-1.2 del tamaño del fémur anterior; franja inferior de cerdas mesokatepisternales extendiéndose dorsalmente mas arriba del borde inferior del mesanepímero 9
Longitud de proboscis 1.2-1.4 del tamaño del fémur anterior; franja inferior de cerdas mesokatepisternales usualmente no se extiende hasta el borde inferior del mesanepímero 10

9(8). Tibia posterior sin banda postmediana de escamas pálidas; laterotergito del segmento abdominal I sin escamas en la porción basal y con pocas escamas en la porción distal, con márgen inferior visible; membrana postprocoxal sin escamas . . . . . *Trichoprosopon digitatum*

Tibia posterior con banda postmediana ancha de escamas pálidas, completa o incompleta; laterotergito con cubierta densa de escamas, con márgen inferior no visible; membrana postprocoxal con escamas . . . . . *Shannoniana*

10(8). Tarsos medio y posterior con escamas pálidas y oscuras; escamas escutales moderadamente anchas y planas; escamas del vértice y occipucio con destellos plateados y azulados. *Johnbelkinia ulopus*

Tarsos medio y posterior únicamente con escamas oscuras; escamas escutales delgadas y curvas ó escamas del vértice y occipucio sin destellos plateados, solamente con reflejos verdes o azules débiles hasta moderados . . . . . *Runchomyia*

11(7). Cerdas prealares ausentes; escuto cubierto de escamas planas de color metálico con destellos iridiscentes; generalmente brocha tibiotarsal de escamas erectas en las patas medias . . *Sabethes*

Cerdas prealares presentes; escuto generalmente de color oscuro, sin escamas de color metálico; patas medias sin brocha tibiotarsal . . . . . .*Wyeomyia*

12(5). Escuto sin cerdas en el disco; escamas del escuto lisas y de color metálico; lóbulos antepronotales agrandados y acercándose a la línea mediodorsal. . . . . *Haemagogus*

Escuto con cerdas en por lo menos el área prescutelar; escamas del escuto de forma variada, pero no lisas ni de color metálico; lóbulos antepronotales pequeños 13

13(12). Cerdas postespiraculares presentes 14

Cerdas postespiraculares ausentes 17

14(13). Escamas muy anchas en el dorso de las venas R_2 y R_3; ápice del abdómen abultado 15

Escamas estrechas en el dorso de R_2 y R_3; ápice del abdómen agudo 16

15(14). Fémures con banda preapical de escamas pálidas bien definida; alas con escamas oscuras . . . . . *Coquillettidia*

Fémures jaspeados con escamas pálidas y oscuras, sin banda preapical; alas jaspeadas asimismo. . . . . *Mansonia*

16(14). Cerdas prespiraculares presentes; bandas o grupos de escamas pálidas en posición apical en tergos abdominales . . . . *Psorophora*

Cerdas prespiraculares ausentes; bandas o grupos de escamas pálidas en posición basal en los tergos . . . . . *Aedes*

17(13). Cerdas prespiraculares presentes; base de la vena subcosta con una franja de cerdas en posición ventral . . . . *Culiseta particeps*
Cerdas prespiraculares ausentes; base de la subcosta sin franja de cerdas 18

18(17). Tarsómero 4 de patas anteriores y medias corto, no mas largo que ancho; escuto con líneas delgadas de escamas blancas . . . . . *Orthopodomyia kummi*
Tarsómero 4 de patas anteriores y medias mas largo que ancho; escuto con otro diseño 19

19(18). Antena con flagelómeros cortos y gruesos; fémur medio con penacho de escamas largas . . . . . *Aedeomyia squamipennis*
Antena con flagelómeros normales (elongados); fémur medio sin penacho de escamas largas 20

20(19). Antena mucho mas larga que proboscis; primer flagelómero dos o mas veces la longitud del segundo . . . . . .*Deinocerites*
Antena mas o menos del largo de proboscis; flagelómero 1 casi del mismo largo que flagelómero 2 . . . . . *Culex*

CLAVE PARA ESPECIES DEL GENERO *AEDES**

1. Escuto con cuatro líneas longitudinales delgadas de escamas pálidas; tergos abdominales II-VII con parches basolaterales de escamas plateadas; garra simple 21
Escuto y abdómen con otros patrones de ornamentación de escamas; garra con diente por lo menos en las patas anteriores y medias 2

2(1). Tarsómeros posteriores con escamas oscuras 3
Tarsómeros posteriores con algunas bandas de escamas pálidas . . . 12

3(2). Integumento del escuto amarillo con parches negros en posición posterolateral 4
Integumento del escuto café o negruzco 5

4(3). Pleura torácica con mancha oscura en el hipostigma; tergos abdominales con escamas amarillas basalmente y escamas oscuras apicalmente . . . . . *fulvus*
Pleura torácica sin mancha oscura en el hipostigma; tergos abdominales cubiertos de escamas amarillas . . . . . *bimaculatus*

5(3). Tarsómero medio 1 con banda basal ancha de escamas pálidas; área interoposterior de la fosa del escuto con parche conspicuo de escamas pálidas . . . . . *sandrae*
Tarsómero medio 1 con escamas oscuras o con líneas delgadas de escamas pálidas; fosa del escuto totalmente oscura, mayormente clara, o con franja pálida en medio del área 6

*Hembra de *Ae. impostor* desconocida.

6(5). Escuto con escamas de color uniforme o con líneas longitudinales de escamas pálidas anchas hasta delgadas que se extienden la longitud total, conectadas con el escutelo 7
Escamas pálidas de la región media del escuto no llegan hasta el escutelo, si llegan lo tocan levemente 11

7(6). Escuto cubierto con escamas de color café, a veces con escamas medias de color amarillo formando una franja parcial . . . . . (una parte) *serratus*
Escuto con línea longitudinal media de escamas amarillas, blancas o plateadas 8

8(7). Escuto con dos franjas de escamas, amarillas hasta blancas, a los lados de la región media . . . . . *angustivittatus*
Escuto con una sola franja de escamas amarillas, blancas o plateadas en la región media 9

9(8). Esternones abdominales con escamas pálidas; parchas basolaterales de escamas pálidas de los tergos abdominales IV-VII extendiéndose dorsalmente . . . . . *tormentor*
Esternones con bandas apicales de escamas oscuras; parches basolaterales de los tergos abdominales IV-VII pequeños, no extendiéndose dorsalmente 10

10(9). Escamas de línea longitudinal media del escuto y lóbulo medio del escutelo amarillas hasta doradas . . . . .(una parte) *serratus*
Escamas de línea longitudinal media del escuto y lóbulo medio del escutelo blancas hasta plateadas . . . . . *hastatus*

11(6). Tibia y tarsómero 1 de la pata posterior con franja conspicua de escamas pálidas en la superficie anterior, ocasionalmente circulando la tibia; abdómen usualmente con franja longitudinal media pálida y difusa en los tergos posteriores . . . . . *scapularis*
Tibia y tarsómero posterior 1 cubierto de escamas oscuras; abdómen con escamas oscuras dorsalmente o parches basomedianos de escamas pálidas . . . . . *euplocamus*

12(2). Tarsómeros posteriores con anillos de escamas pálidas en posición apical y basal en, por lo menos, un segmento 13
Tarsómeros posteriores con anillos pálidos solamente en posición basal 19

13(12). Tarsómeros medio y posterior con banda ancha de escamas plateadas que abarca el ápice del segmento 1 y la base del segmento 2. . 14
Tarsómeros medio y posterior con bandas delgadas de escamas pálidas colocadas apical y basalmente en varias articulaciones de los segmentos 18

14(13). Fémur posterior con banda basal de escamas oscuras ancha y completa; escamas plateadas del área supraalar llegan hasta la sutura del escuto 15
Fémur posterior con banda basal de escamas oscuras incompleta, si está completa, entonces las escamas del área supraalar no alcanzan la sutura del escuto 16

15(14). Occipucio con todas las escamas inclinadas delgadas y curvas; mesanepímero con parche de escamas entero . . . . . *insolitus*
Occipucio con área lateral de escamas inclinadas anchas y excamas delgadas y curvas en la línea media; mesanepímero con parche de escamas usualmente dividido en dos . . . . . (una parte) *homoeopus*

16(14). Cerdas acrosticales ausentes; tarsómero medio 1 con banda media de escamas oscuras usualmente incompleta, si está completa mide menos de 0.3 de la longitud del segmento . . . . *podographicus*
Cerdas acrosticales presente; tarsómero medio 1 con banda de escamas oscuras usualmente ancha y completa, midiendo 0.3 a 0.6 de la longitud del segmento 17

17(16). Fémur medio sin mancha clara en ápice, si presente, forma una franja individual de escamas apicales; parche subespiracular de escamas ausente . . . . . *daryi*
Fémur medio con mancha clara y ancha en ápice, extendiéndose mas allá de cerdas subapicales anteriores; parche subespiracular de escamas presente o ausente . . . . . (una parte) *homoeopus*

18(13). Superficie exterior de coxa trasera con parche de escamas grande; paratergito y laterotergito desnudos; tarsómero posterior 5 usualmente cubierto con escamas pálidas en el dorso . . .*epactius*
Superficie exterior de coxa trasera sin escamas; paratergito y laterotergito usualmente con escamas; tarsómero posterior 5 cubierto de escamas oscuras o con pequeño parche de escamas pálidas . . . . . *fluviatilis*

19(12). Proboscis con anillo pálido en la región media . . . . *taeniorhynchus*
Proboscis sin anillo pálido en la región media 20

20(19). Bandas basales de escamas pálidas en los tergos abdominales bilobuladas posteriormente; tarsómeros posteriores con anillos delgados de escamas pálidas . . . . . *vexans*
Bandas basales en los tergos abdominales rectas; tarsómeros posteriores con bandas basales anchas de escamas pálidas. . *aegypti*

21(1). Fémur medio sin mancha blanca o plateada en superficie anterior, arriba de línea ventral clara . . . . . *quadrivittatus*
Fémur medio con mancha o línea blanca o plateada mas o menos distinguible en superficie anterior arriba de la línea ventral clara 22

22(21). Area antealar con numerosas escamas bronce oscuro debajo de línea supraalar estrecha y dorada . . . . . *sexlineatus*
Area antealar con escamas blancas, amarillas o doradas; márgen lateral y líneas supraalares unidas, sin escamas bronce oscuro 23

23(22). Tarsómeros posteriores con anillos basales de escamas blancas únicamente en los segmentos 1 y 2 . . . . . *guatemala*
Tarsómeros posteriores con anillos basales de escamas blancas en los segmentos 1-3 24

24(23). Postpronoto con escamas pálidas anchas y aplanadas excepto en el borde dorsal que posee escamas amarillentas, curvas y moderadamente anchas; escamas postespiraculares usualmente presentes . . . . . *guerrero*
Postpronoto con escamas amarillentas curvas, delgadas o moderadamente anchas excepto en el ángulo ventroposterior, donde se encuentran algunas escamas pálidas, anchas y aplanadas; escamas postespiraculares ausentes . . . . . *allotecnon*

CLAVE PARA ESPECIES DEL GENERO *ANOPHELES*

1. Tarsómeros posteriores 2-5 con bandas basales anchas de escamas oscuras; vena R_{4+5} generalmente con mancha pálida basal única (subgénero *Kerteszia*) . . . . . *neivai*
Tarsómeros posteriores 2-5 con otros diseños, a veces completamente oscuros; vena R_{4+5} con escamas oscuras, con manchas de escamas pálidas o cubierta de escamas pálidas 2

2(1). Tarsómeros posteriores completamente cubiertas de escamas oscuras, con algunos segmentos jaspeados con escamas pálidas o con bandas de escamas pálidas en algunas articulaciones (subgénero *Anopheles*) 3
Tarso posterior con parte del tarsómero 2 y los tarsómeros 3, 4 y 5 cubiertos de escamas pálidas, anillo basal de escamas oscuras en 5 presente o ausente (subgénero *Nyssorhynchus*). . . 14

3(2). Fémur, tibia y tarsómeros de pata posterior completamente cubiertos de escamas oscuras o con anillos pálidos en algunas articulaciones, no jaspeados con escamas pálidas 4
Fémur, tibia y algunos tarsómeros de pata posterior jaspeados con escamas pálidas a veces con anillos pálidos múltiples . . . 9

4(3). Tibia posterior con banda o parche apical ancho de escamas pálidas; ala con escamas oscuras exceptuando 1 ó 2 manchas pálidas en el ápice; vena anal con escamas oscuras 5
Tibia posterior sin banda o parche pálido; ala con escamas pálidas en varias venas; vena anal con escamas pálidas y oscuras . 6

5(4). Palpos cubiertos de escamas oscuras . . . . . *xelajuensis*
Palpómeros 3 y 4 con anillos de escamas pálidas, 5 completamente pálido . . . . . *eiseni*

6(4). Vena costa con escamas oscuras, exceptuando la mancha apical pálida . . . . . *crucians*
Vena costa con 2 ó mas manchas de escamas pálidas 7

7(6). Vena costa con manchas pálidas prehumeral y humeral ausentes; vena anal con escamas pálidas en la región basal y escamas oscuras en la región apical . . . . . *pseudopunctipennis*
Vena costa con manchas pálidas prehumeral y humeral presentes; vena anal con 3 manchas de escamas oscuras 8

8(7). Vena R_{4+5} con 2 manchas de escamas oscuras; patas medias y posteriores con escamas blancas en las coxas, trocanteres y basalmente en los fémures . . . . . *hectoris*
Vena R_{4+5} con 3 manchas de escamas oscuras; patas medias y posteriores con escamas amarillas en las coxas, trocanteres y basalmente en los fémures . . . . . *parapunctipennis* var. *guatemalensis*

9(3). Tergos abdominales II-VII sin penachos grandes de escamas en posición lateral; vena R_{4+5} mayormente cubierta de escamas oscuras . . . . . *vestitipennis*
Tergos abdominales II-VII con penachos laterales grandes; vena R_{4+5} mayormente cubierta de escamas pálidas 10

10(9). Palpos con escamas oscuras; escuto con mancha oscura en el área prescutelar o sin ella . . . . . *gabaldoni*
Palpos con anillos de escamas pálidas; escuto con 3 manchas oscuras 11

11(10). Costa con 2 manchas de escamas oscuras; vena Cu con 2 manchas basales oscuras el resto con escamas pálidas . . . . . *neomaculipalpus*
Costa con 3 manchas de escamas oscuras; vena Cu usualmente con una mancha basal oscura o cubierta de escamas oscuras 12

12(11). Mancha preapical oscura mas pequeña que mancha sector oscura; escamas del ala truncadas apicalmente . . . . . *intermedius*
Mancha preapical oscura casi del mismo tamaño que la mancha sector; escamas del ala redondeadas apicalmente. 13

13(12). Venas Cu y Cu_2 mayormente cubiertas de escamas pálidas; mancha apical oscura difusa . . . . . *punctimacula*
Venas Cu y Cu_2 mayormente cubiertas de escamas oscuras; mancha apical intensamente oscura . . . . . *apicimacula*

14(2). Tarsómero posterior 5 con anillo basal de escamas oscuras 15
Tarsómero posterior 5 cubierto de escamas pálidas 17

15(14). Penachos caudolaterales de escamas oscuras ausentes del segmento abdominal II; palpómero 4 totalmente oscuro o con escamas amarillas hasta dorado cafés en la superficie mediolateral, nunca blancas o de color crema; tarsómero anterior 5 usualmente oscuro . . . . . *albimanus*
Penachos caudolaterales de escamas oscuras presentes en II; palpómero 4 con por lo menos algunas escamas blancas o cremas en la superficie mediolateral; tarsómero anterior 5 variable 16

16(15). Tarsómero posterior 2 con banda basal oscura usualmente menos de 0.25 de la longitud del segmento; vena costa con escamas pálidas de color crema . . . . . *oswaldoi*
Tarsómero posterior 2 con banda basal oscura de 0.3 o mas de la longitud del segmento; vena costa con escamas pálidas de color blanco . . . . . *strodei*

17(14). Esternón abdominal I con 2 líneas longitudinales paralelas de escamas pálidas; vena R_3 con escamas pálidas en el ápice presentes . . . . . *allopha*
Esternón abdominal I sin líneas; vena R_3 con escamas pálidas en el ápice presentes o ausentes 18

18(17). Mesanepímero anterior con parche de escamas pálidas; costa con mancha basal oscura 4.0 veces mas larga que mancha humeral pálida; vena R_3 con 3 manchas oscuras . . . . . *darlingi*
Mesanepímero anterior desnudo; costa con mancha basal oscura no mas larga que mancha humeral pálida; vena R_3 con 2 manchas oscuras . . . . . *argyritarsis*

CLAVE PARA ESPECIES DEL GENERO *COQUILLETTIDIA* *

Superficie anterior de las tibias oscura, exceptuando banda pálida en posición preapical . . . . . *nigricans*
Superficie anterior de las tibias jaspeada con escamas pálidas . . . . . *venezuelensis*

CLAVE PARA SUBGENEROS DEL GENERO *CULEX* **

1. Cerdas acrosticales presentes en disco del escuto 2
Cerdas acrosticales únicamente en el espacio prescutelar y/o el extremo anterior del escuto 6

2(1). Usualmente 6 ó mas cerdas mesanepimerales inferiores; fémures jaspeados con escamas pálidas; costa con áreas alternadas de escamas cafés y amarillas . . . . . *Lutzia*
Usualmente 1, 2 ó raramente 3 cerdas mesanepimerales inferiores; fémures sin escamas pálidas; costa sin áreas alternadas de escamas cafés y amarillas. 3

3(2). Tergos abdominales con manchas laterales pálidas en posición apical . . . . . *Neoculex* (*derivator*)
Tergos abdominales con bandas o manchas laterales pálidas en posición basal, o totalmente cubiertos de escamas oscuras . . . 4

*Clave adaptada de Belkin et al. (1970).
** Clave adaptada de Berlin y Belkin (1980).

4(3). Mesokatepisterno con parche de escamas conspicuo, si el parche tiene pocas escamas o está ausente, las escamas inclinadas del occipucio son de color bronce y la pleura es de color café . . . . . *Culex*

Mesokatepisterno con pocas escamas a lo largo de las cerdas; escamas inclinadas del occipucio blancas; pleura mayormente de color amarillo 5

5(4). Integumento de la pleura pálido hasta amarillento; esternones I-VI con banda apical de escamas oscuras . . . . . (una parte) *Anoedioporpa (restrictor)*

Integumento de la pleura mayormente pálido o amarillento, pero café en el postpronoto y mesokatepisterno inferior; esternones I-VI con pocas escamas oscuras en posición apical . . . . . *Micraedes (erethyzonfer)*

6(1). Tergos abdominales con manchas basolaterales con destellos metálicos . . . . . *Carrollia*

Tergos abdominales cubiertos de escamas oscuras o con manchas pálidas, pero no metálicas 7

7(6). Occipucio con por lo menos una línea de escamas anchas e inclinadas a lo largo de la línea ocular; usualmente todos las escamas del occipucio son anchas . . . . . *Melanoconion*

Occipucio con escamas inclinadas delgadas aun a lo largo de la línea ocular . . . . . (una parte) *Anoedioporpa (conservator)*

CLAVE PARA ESPECIES DEL SUBGENERO *CARROLLIA**

Esternones abdominales cubiertos de escamas pálidas . . . . *bihaicola*

Esternones abdominales IV-VI con bandas conspicuas de escamas oscuras en posición apical . . . . . *metempsytus*

CLAVE PARA LAS ESPECIES DEL SUBGENERO *CULEX*

1. Por lo menos algunos tarsómeros con anillos de escamas pálidas. . . 2

Todos los tarsómeros con escamas oscuras 9

2(1). Proboscis con anillo de escamas pálidas 3

Proboscis cubierta con escamas oscuras o con escamas pálidas ventralmente, pero sin anillo 4

3(2). Palpos con escamas en el ápice; esternones con parche ovalado de escamas oscuras en la región media . . . . . *peus*

Palpos cubiertos con escamas oscuras; esternones con banda ancha de escamas oscuras en posición apical . . . . (una parte) *corniger*

*Clave adaptada de Valencia (1973).

4(2). Tarsómeros posteriores únicamente con anillos basales de escamas pálidas . . . . . *declarator*
Tarsómeros posteriores con anillos basales y apicales de escamas pálidas . . . . . *mollis*
. 5

5(4). Tarsómero posterior 5 totalmente cubierto de escamas pálidas 6
Tarsómero posterior 5 cubierto parcial o totalmente con escamas oscuras 8

6(5). Esternones abdominales II-VI con parches triangulares de escamas oscuras . . . . . .*thriambus*
Esternones II-VI con bandas apicales de escamas oscuras 7

7(6). Proboscis cubierta con escamas oscuras . . . . . *pinarocampa*
Proboscis con escamas pálidas ventralmente . . . . . *stenolepis*

8(5). Esternones abdominales con bandas anchas de escamas oscuras en posición apical . . . . . (una parte) *corniger*
Esternones abdominales cubiertos en su mayoría o totalmente con escamas pálidas . . . . . .*coronator*
ousqua
usquatus

9(1). Tergos abdominales con bandas pálidas basales conspicuas en la mayoría de segmentos 10
Tergos abdominales sin bandas basales pálidas, si presentes son delgadas y se encuentran en algunos segmentos solamente 11

10(9). Bandas abdominales de escamas claras redondeadas en el márgen posterior y recortadas lateralmente, totalmente separadas o unidas levemente a los parches laterales; escamas del escuto gruesas y doradas . . . . . *quinquefasciatus*
Bandas abdominales con el márgen posterior recto y unidas a los parches laterales, particularmente en los segmentos III-IV; escamas del escuto delgadas y de color café dorado . .*interrogator*

11(9). Tergos abdominales con bandas pálidas delgadas en posición basal . . . . . *chidesteri*
Tergos abdominales con escamas oscuras exceptuando los parches basolaterales de escamas pálidas 12

12(11). Pleura sin escamas, si presentes, nunca hay mas de 5 ó 6 en un grupo; esternones con escamas pálidas . . . . . *nigripalpus*
Pleura con varios parches de escamas pálidas; esternones con bandas apicales de escamas oscuras . . . . . *inflictus*

CLAVE PARA ESPECIES DEL SUBGENERO *LUTZIA*

Mancha subcostal pálida extendiéndose solamente hasta vena subcosta; vena Cu con escamas oscuras extendiéndose desde la base hasta la bifurcación de Cu_1 y Cu_2 . . . . . *bigoti*
Mancha subcostal pálida abarca la vena R_1 además de la costa y la subcosta; Cu con escamas oscuras sólamente en la base de la vena . . . . . *allostigma*

CLAVE PARA ESPECIES DEL SUBGENERO *MELANOCONION**

1. Tarsómeros posteriores 1-4 con anillos pálidos en las articulaciones; tarsómero 5 cubierto con escamas pálidas 2
Tarsómeros posteriores sin escamas pálidas en las articulaciones. . 3

2(1). Esquina dorsal del mesokatepisterno con un parche conspicuo de escamas; fémures sin parche apical de escamas pálidas. . *taeniopus*
Esquina dorsal del mesokatepisterno sin parche de escamas; fémures con parche apical de escamas pálidas . . . . . *pedroi*

3(1). Escuto con escamas doradas en 0.6 de la porción anterior, con escamas café oscuro en la región restante; área ancha central del occipucio cubierta mayormente por escamas delgadas lineales o en forma de media luna . . . . . *chrysonotum*
Escuto parcial o totalmente cubierto de escamas café oscuro; área central del occipucio con escamas anchas aplanadas, o sin escamas 4

4(3). Parte superior del mesanepímero con parche de escamas pálido . . . . . *erraticus*
Parte superior del mesanepímero sin parche de escamas 5

5(4). Parte inferior del mesanepímero con 4-5 escamas largas y delgadas, en forma de pelo; mesanepímero sin integumento pálido. . *iolambdis sardinerae*
Parte inferior del mesanepímero sin escamas, con integumento pálido o de otro color 6

6(5). Parte del mesokatepisterno debajo del márgen ventral del mesanepímero con proporción ancho/largo de 1.2:1; mesanepímero con integumento dorsal pálido en 0.6 de la longitud . . . . . *pilosus*
Parte del mesokatepisterno debajo del márgen ventral del mesanepímero con proporción ancho/largo 1:1; integumento del mesanepímero con otra coloración, 0.6 del área no totalmente pálida 7

7(6). Parte superior del mesokatepisterno con parche de mas de 3 escamas anchas . . . . . *trifidus*
Parte superior del mesokatepisterno con parche de 3 o menos escamas 8

*La hembra adulta de *Cx. paracrybda* se desconoce. S. Sirivanakarn colaboró en la construcción de esta clave.

8(7). Esternones abdominales con bandas basales delgadas de escamas pálidas y bandas apicales anchas de escamas oscuras; fémur posterior con banda apical oscura 9
Esternones cubiertos de escamas pálidas o con mancha apical de escamas oscuras; fémur posterior con línea ventral pálida extendiéndose hasta el ápice 11

9(8). Occipucio con banda anterior delgada de escamas anchas e inclinadas, posteriormente con escamas delgadas y amarillentas . . . . . *eastor*
Occipucio con banda gruesa de escamas anchas e inclinadas 10

10(9). Mesanepímero con mancha pálida muy visible . . . . . *bastagarius*
Mesanepímero sin mancha pálida . . . . . *conspirator*

11(8). Segunda cerda de la fila sobre coxa media mas larga que la primera o tercera cerda; célula R_2 7.0 mas larga que la vena R_{2+3} . . . . . *educator*
Segunda cerda de la fila de la coxa media no mas larga que la primera y/o la tercera cerda; célula R_2 5.0 mas larga que vena R_{2+3} 12

12(11). Borde anterior del occipucio con escamas anchas e inclinadas . . . . . *elevator*
Area central del borde anterior del occipucio con escamas largas y delgadas . . . . . *panocossa*

CLAVE PARA ESPECIES DEL GENERO *DEINOCERITES**

1. Mesanepímero sin escamas 2
Mesanepímero con parche de escamas traslúcidas 3

2(1). Cercos con dos cerdas largas de forma espatulada en posición apical o subapical; tergo IX sin cerdas (Costa Atlántica) . . . . . *cancer*
Cercos sin cerdas espatuladas; tergo IX con 1-6 cerdas de cada lado (Costa Pacífica) . . . . . *belkini*

3(1). Cerda inferior del mesanepímero ausente; antena con flagelómeros 1-4 notablemente mas largos que los otros (Costa Atlántica). . . . . *epitedeus*
Cerda inferior del mesanepímero presente; antena con el primer flagelómero notablemente mas largo que los otros (Costa Pacífica) 4

4(3). Antena sobrepasa la proboscis aproximadamente desde la base del flagelómero 8; tergo IX usualmente sin cerdas, a veces 1 presente . . . . . *pseudes*
Antena mas larga, sobrepasando la próboscis por lo menos desde los 2/3 basales del flagelómero 7; tergo IX con 2 ó mas cerdas (2-7) de cada lado . . . . . *howardi*

*Clave adaptada de Adames (1971).

CLAVE PARA ESPECIES DEL GENERO *HAEMAGOGUS* *

1. Garras anteriores y medias con diente sub basal; mesopostnoto desnudo; vena R_{2+3} sobrepasa 0.5 de la longitud de vena R_2 2
   Garras anteriores y medias sin diente; mesopostnoto con 2 cerdas pequeñas colocadas posteriormente; R_{2+3} usualmente menos de 0.5 de la longitud de R_2 4

2(1). Pata media con escamas blancas o grises en la superficie externa de los tarsómeros proximales 2 ó 3 . . . . . *mesodentatus*
   Tarso medio cubierto de escamas oscuras 3

3(2). Fémures medio y posterior con manchas conspicuas de escamas plateadas presentes en posición anteroapical . . . . . *equinus*
   Fémures medio y posterior sin manchas plateadas . . . . *anastasionis*

4(1). Integumento del ápice de las coxas, trocanteres y base de los fémures amarillo; escamas del vértice moradas; occipucio con escamas de color amarillo café; escamas del escuto de color cobrizo . . . . . *aeritinctus*
   Integumento de la base de las coxas trocanteres y base de fémures negro; escamas del vértice y occipucio azul hasta violeta; escamas del escuto bronce hasta verde o azul, raramente cobrizas . . . . . *regalis*

CLAVE PARA ESPECIES DEL GENERO *LIMATUS* **

Límite entre escamas dorsales oscuras y escamas laterales pálidas de los tergos abdominales formando una línea recta; escutelo con escamas amarillentas . . . . . *asulleptus*
Límite entre escamas dorsales oscuras y escamas laterales pálidas de los tergos formando un patrón denticular o serrado; escutelo con escamas moradas . . . . . *durhamii*

CLAVE PARA ESPECIES DEL GENERO *MANSONIA* ***

Apice del tergo abdominal VII con una fila de espinas cortas y oscuras; superficie ventral de proboscis predominantemente cubierta de escamas oscuras, a veces jaspeada con escamas pálidas . . . . . *titillans*
Apice del tergo VII sin fila de espinas; superficie ventral de proboscis con banda ancha de escamas pálidas en el tercio medio . . . . . *dyari*

*Clave adaptada de Arnell (1973).
**Clave adaptada de Lane (1953).
***Clave adaptada de Belkin et al. (1970).

CLAVE PARA ESPECIES DEL GENERO *PSOROPHORA**

1. Escuto con áreas sin escamas entre cerdas acrosticales y dorsocentrales y entre cerdas preescutelares y supraalares; especies de tamaño grande (subgénero *Psorophora*) 2
Escuto con escamas presentes entre cerdas acrosticales y dorsocentrales y entre preescutelares y supraalares; especies de tamaño mediano a pequeño 5

2(1). Tarsos cubiertos de escamas oscuras 3
Tarsómeros posteriores 1-3 con parches o bandas basales de escamas pálidas 4

3(2). Pleura con cubierta uniforme de escamas pálidas . . . . . *cilipes*
Pleura con parches de escamas pálidas . . . . . *lineata*

4(2). Escuto con franja longitudinal delgada de escamas doradas en la región media; mitad distal de proboscis cubierta parcialmente por escamas amarillas . . . . . *ciliata*
Escuto con franja longitudinal de escamas bronce oscuro en la región media; proboscis cubierta de escamas oscuras. . . *howardii*

5(1). Garras tarsales sin dientes; tibias jaspeadas con escamas pálidas; proboscis con anillo de escamas pálidas o con escamas pálidas en la porción ventral (subgénero *Grabhamia*) . . . . . *confinnis*
Garras tarsales con dientes; tibias cubiertas de escamas oscuras; proboscis sin escamas pálidas (subgénero *Janthinosoma*) 6

6(5). Tarsómero posterior 5 cubierto de escamas oscuras; tarsómero posterior 4 mayormente con escamas pálidas . . . . . *varipes*
Tarsómeros posteriores 4 y 5 cubiertos de escamas pálidas 7

7(6). Escuto con escamas doradas y bronce oscuro entremezcladas, sin formar un patrón definido . . . . . *ferox*
Escuto con franja longitudinal ancha y conspicua de escamas oscuras en la región media 8

8(7). Lóbulo medio del escutelo con escamas amarillas . . . . . *champerico*
Lóbulo medio del escutelo con escamas oscuras 9

9(8). Proboscis definitivamente mas larga que fémur anterior; pedicelo de antena con escamas blancas . . . . . *albipes*
Proboscis del mismo tamaño o mas corta que el fémur anterior; pedicelo de antena sin escamas . . . . . *lutzii*

*Clave adaptada de Lane (1953).

CLAVE PARA ESPECIES DEL GENERO *RUNCHOMYIA**

Límite de las escamas oscuras dorsales y las escamas plateadas ventrales de los tergos abdominales en aspecto lateral forma una línea recta; lóbulo medio del escutelo con escamas plateadas . . . . . *magna*

Límite de las escamas oscuras dorsales y las escamas amarillas-blancas ventrales de los tergos abdominales en aspecto lateral forma incisiones redondeadas; lóbulo medio del escutelo con escamas oscuras . . . . . *espini*

CLAVE PARA ESPECIES DEL GENERO *SABETHES**

1. Cerdas proepisternales presentes; tarso medio con línea de escamas pálidas en superficie exterior; patas medias sin espátulas de escamas largas (subgénero *Sabethoides*) . . . *chloropterus*

Cerdas proepisternales ausentes; tarso medio sin línea de escamas pálidas en superficie exterior; patas medias con espátulas de escamas largas (subgénero *Sabethes*) 2

2(1). Tarsómeros con marcas de escamas blancas . . . . . *tarsopus*

Tarsómeros cubiertos de escamas oscuras . . . . . *cyaneus*

CLAVE PARA ESPECIES DEL GENERO *SHANNONIANA***

1. Unicamente tarsómero posterior 5 con escamas pálidas . . . *moralesi*

Tarsómeros posteriores con escamas oscuras o varias segmentos con escamas pálidas 2

2(1). Todos los tarsómeros posteriores con escamas pálidas; palpos largos; cerdas postespiraculares presentes . . . . . especie 2

Tarsómeros posteriores con escamas oscuras; palpos cortos; cerdas postespiraculares ausentes 3

3(2). Area antealar con escamas de color crema; tamaño mediano. . especie 3

Area antealar con escamas oscuras; tamaño pequeño . . . . . especie 1

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*Clave adaptada de Lane (1953).

**Clave formulada con información proveída por Zavortink (1981, in litt.).

CLAVE PARA ESPECIES DEL GENERO *TOXORHYNCHITES* *

1. Abdómen con penachos de color rojo en posición apicolateral en el segmento VII . . . . . *haemorrhoidalis superbus*
Abdómen sin penachos rojos en segmento VII 2

2(1). Tibias de color oscuro . . . . . *theobaldi*
Tibias mayormente doradas, principalmente en patas medias y posteriores . . . . . *grandiosus*

CLAVE PARA ESPECIES DEL GENERO *URANOTAENIA* **

1. Tarsómeros posteriores cubiertos de escamas oscuras 2
Algunos tarsómeros posteriores con marcas de escamas pálidas 3

2(1). Escuto con línea media delgada de escamas azuladas; lóbulos antepronotales cubiertos de escamas azules; tibia y fémur posterior con mancha apical grande de escamas pálidas; tergos oscuros exceptuando bandas apicales pálidas y delgadas en III y V . . . . . *socialis*
Escuto sin línea media de escamas azuladas; lóbulos antepronotales con parche de escamas plateadas; patas posteriores oscuras, sin manchas apicales pálidas en fémur y tibia; tergos oscuros . . . . . *orthodoxa*

3(1). Tarsómeros posteriores con escamas pálidas por lo menos en base y ápice de los segmentos 4
Primer, segundo y parte del tercer tarsómero posterior oscuros, el resto con escamas blancas 5

4(3). Tarsómeros posteriores 4 y 5 cubiertos con escamas blancas; escuto con mancha de escamas azuladas en la región media, inmediatamente anterior al área prescutelar; tamaño grande . . . . . *geometrica*
Tarsómero posterior 4 con anillo oscuro en la región media; tarsómero 5 cubierto de escamas blancas; escuto con línea delgada de escamas azules extendiéndose desde el márgen anterior hasta el área prescutelar; especie mediana. *pulcherrima*

5(3). Línea de escamas azules sobre base del ala extendiéndose mas allá del márgen anterior del paratergito; integumento del escuto café oscuro; tamaño mediano . . . . . *coatzacoalcos*
Línea de escamas azules sobre base del ala no alcanza márgen anterior del paratergito; integumento del escuto amarillo, con banda media y dos manchas grandes café oscuro sobre bases de alas; tamaño pequeño . . . . . *lowii*

*Clave adaptada de Lane (1953).
**Clave adaptada de Galindo et al. (1954).

CLAVE PARA ESPECIES DEL GENERO *WYEOMYIA**

1. Sección basal de vena M del ala con las escamas laterales anteriores liguladas y escamas aplanadas delgadas, cuyo ancho no excede el grosor de la vena (subgénero *Wyeomyia*) 2

   Sección basal de M con escamas laterales anteriores mas anchas, escamas aplanadas anchas o todas las escamas largas y anchas, mas anchas que el grosor de la vena (subgénero *Dendromyia*) 6

2(1). Lóbulos antepronotales con escamas de color azul violáceo metálico, sin escamas blancas; línea ocular con escamas oscuras. . . . . *celaenocephala*

   Lóbulos antepronotales con o sin escamas de color metálico, siempre con algunas escamas pálidas; línea ocular con por lo menos algunas escamas pálidas 3

3(2). Algunos tarsómeros con marcas de escamas pálidas 4

   Tarsómeros cubiertos de escamas oscuras 5

4(3). Solamente tarsómeros posteriores con escamas pálidas . . . . . *hemisagnosta*

   Tarsómeros medio o medio y posterior con escamas pálidas . . . . . *guatemala*

5(3). Antenas tan largas como proboscis; articulaciones entre fémur y tibia con manchas de escamas pálidas; lóbulos antepronotales con escamas oscuras, sin destellos metálicos . . . . . *arthrostigma*

   Antenas 0.5-0.75 de la longitud de la proboscis; sin manchas en las articulaciones entre fémur y tibia; lóbulos antepronotales con escamas oscuras con destellos metálicos . . . . . *abebela melanopus*

6(1). Unicamente el tarsómero posterior con escamas pálidas; lóbulos antepronotales dorados o con ápice dorado . . . *aporonoma*

   Tarsómeros medio o medio y posterior con escamas pálidas; lóbulos antepronotales con otros colores 7

7(6). Tarsómeros medios 4 y 5 con escamas oscuras; occipucio con franja pálida en el medio . . . . . *pseudopecten*

   Tarsómeros medios 4 y 5 con escamas pálidas en línea continua; occipucio sin franja pálida en el medio . . . . . *chalcocephala*

*Clave adaptada de Lane (1953).

MORPHOLOGY OF FOURTH STAGE LARVA

The fourth stage larva, contrary to the adult, is largely covered by soft, membranous tissue, but with some few parts consisting of hardened, sclerotized plates. The head and siphon are completely sclerotized, while the thorax and abdomen are mostly membranous. The larval body bears some 190 pairs of setae (see Figs. 7,8) and various spiniforms and spicules as well, depending on the species. Since many taxonomic characters are based on setae it is necessary to know their nomenclature and the abbreviations of the body structures on which they occur in order to be able to locate them on a specimen. In the keys to the fourth stage larvae abbreviations for the principal parts of the body are as follows:

antenna	- A	mesothorax	- M
head	- C	metathorax	- T
prothorax	- P	abdominal segments	- I to X
siphon - S			

For example, 6-IV-V means seta 6 on abdominal segments IV and V. For further familiarization of the larval chaetotaxy, the reader should consult Harbach & Knight (1980, pp. 163-172 and Figs. 66-68, pp 249-253).

Head: The head bears mandibulate mouthparts ventrally, and posteriorly an opening, known as the occipital foramen, to which the cervix is attached. The mouthparts contain many setae which complicate understanding their arrangement. Just above the mouth opening is an appendage, the labrum. Surrounding it laterally and ventrally are 2 pairs of heavily sclerotized structures, the mandibles, and ventral to them, the maxillae. Connected to the maxillae laterally are the maxillary palpi, usually appearing as separate, cylindrical appendages. Anterolaterally to the mouthparts will be found the lateral palatal brushes, or mouth brushes. In most mosquito larvae they consist of a group of long fine setae, but in certain predatory larvae they are composed of a few stout, curved rods. The tubular antennae are located anterolateral to the mouth brushes. They vary in size and shape and in the location of seta 1-A.

Thorax: The thorax appears as a single undivided region of the body (see Figs. 7,8 - P,M,T). The pro-, meso- and metathoracic segments may be distinguished by the 3 distinct sets of setae found on the thorax.

Abdomen: The abdomen contains 10 segments. The first 7 are similar, while the 3 terminal segments are modified for respiration and swimming. In most anophelines, at least some of abdominal segments I-VII have seta 1 developed as a palmate seta, whose branches are flattened and called leaflets (Fig. 7).

Segment VIII bears the external respiratory organs. In anophelines they consist of a sessile spiracular apparatus which has 5 lobes, anterior lobe (ASL), 2 anterolateral lobes (LSL) and 2 posterolateral lobes (PSL). Laterally it is supported by pecten plates (PP), heavily sclerotized and possessing spines posteriorly, see Fig. 9 B,C.

In culicines, the spiracular apparatus is borne on the end of a tube, the siphon (Figs. 8,9 S), which varies greatly in length and form among the different species. A method of expressing this difference is the siphon index, the ratio of its length divided by its basal width. In most culicine genera the siphon has a row of specialized spines, usually

confined to the basal 0.5, termed the pecten (Fig. 9A, Pt, PS). However, in certain genera the pecten is absent. Laterally on segment VIII are found the comb scales (CS) in the culicine larvae. They vary in form and number.

Segment X, the anal segment (Fig. 9A) bears a prominent sclerite, the saddle (Sa), 2-4 fleshy terminal lobes, the anal papillae (APP), and usually a ventral brush, seta 4-X (Fig. 8). The latter is composed of fanlike setae ventroposterior in position which are usually attached to a network of sclerotized bars, called the grid (Fig. 9A, G). The setae joined to the grid are known as the cratal setae; those located anteriorly to the grid but still forming part of the ventral brush are called the precratal setae.

MORFOLOGIA DE LAS LARVAS DE CUARTO ESTADIO

El cuerpo de la larva está cubierto mayormente por tejido suave y membranoso. Algunas partes están formadas de placas esclerotizadas y endurecidas. La cabeza y el sifón son totalmente esclerotizados, mientras que el tórax y abdómen son mayormente membranosos.

El cuerpo de la larva posee alrededor de 190 pares de cerdas (Figs. 7,8) asi como varias espiculas y espinas dependiendo de la especie. Muchos caracteres taxonómicos importantes se basan en el número y la posición de las cerdas. Por ello, es necesario conocer su nomenclatura y las abreviaturas de las estructuras corporales en donde están colocadas, para localizarlas fácilmente en un especimen. En las claves para larvas de cuarto estadío se utilizan las siguientes abreviaturas:

A - antena	M - mesotórax
C - cabeza	T - metatórax
P - protórax	I-X - segmentos del abdómen
S - sifón	

Por ejemplo, 6-IV-V significa cerda 6 de los segmentos abdominales IV y V. Para información adicional sobre la quetotaxia de la larva consúltese Harbach y Knight (1980, pp. 163-172 y Figs. 66-68, pp. 249-253.

Cabeza: La cabeza posee las partes bucales mandibuladas en posición ventral y posteriormente una abertura llamada forámen occipital; el cuello o cervix está unido a esta abertura. Las partes bucales poseen varias cerdas que hacen difícil distinguir todos los apéndices. Justo arriba de la abertura bucal se encuentra el labro. Rodeando la boca en posición lateral y ventral respectivemente están las mandíbulas, fuertemente esclerotizadas, y las maxilas debajo de ellas. Los palpos maxilares, los apéndices cilíndricos, están conectados lateralmente a las maxilas. Anterolateralmente a las partes bucales están los cepillos bucales. En la mayoría de larvas consisten de un grupo de cerdas largas y finas; en las larvas carnívoras aparecen como ganchos curvados. Las antenas, de forma tubular, están localizadas anterolateralmente a los cepillos bucales. Estas varían el la forma y localización de la cerda 1-A.

Tórax: El tórax aparenta ser una región corporal sin divisiones (Figs. 7,8 - P,M,T). El pro, meso y metatórax pueden distinguirse por los grupos de cerdas que se encuentran en cada segmento tóracico.

Abdómen: El abdómen consiste de 10 segmentos. Los 7 primeros son similares entre si, mientras que los 3 segmentos terminales están modificados para respirar y nadar. En la mayoría de los anofelinos algunos de los segmentos abdominales I-VII tienen la cerda 1 desarrollada en forma palmeada, con ramas planas llamadas hojillas (Fig. 7).

El segmento VIII posee los órganos respiratorios externos. En los anofelinos consisten de un aparato espiracular unido directamente al segmento VIII y formado de 5 lóbulos: lóbulo anterior (ASL), 2 lóbulos anterolaterales (LSL), y 2 lóbulos posterolaterales (PSL). El aparato espiracular está apoyado en la placa del pécten (PP), que es una estructura fuertemente esclerotizada y con espinas posteriores (Fig. 9 B,C). En los culicinos el aparato espiracular está colocado al final del sifón (Fig. 8,9 S). El sifón es de forma y tamaño variable en las diferentes especies de mosquitos. El índice sifonal, que expresa la relación entre el largo y el ancho basal de esta estructura es un caracter útil en la taxonomía de mosquitos. En la mayoría de géneros de culicinos, el sifón posee una fila de espinas especializadas llamada pécten, generalmente restringida a la mitad basal (Fig. 9A, Pt, PS). En algunos grupos el pécten está ausente. En los culicinos los dientes del peine (CS) están situados lateralmente en el segmento VIII y varían en forma y número.

El segmento X o segmento anal (Fig. 9A) posee: un esclerito prominente llamado silla de montar (Sa), 2 a 4 lóbulos terminales gruesos llamados papilas anales (APP) y usualmente la broche ventral o cerda 4-X (Fig. 8). Esta última se compone de una serie de cerdas en posición ventroposterior que parten de un grupo de barras esclerotizadas llamadas red (Fig. 9A, G). Las cerdas adheridas a la red (cerdas cratales) y las cerdas localizadas en la parte anterior a la red (cerdas precratales), son caracteres taxonómicos de importancia.

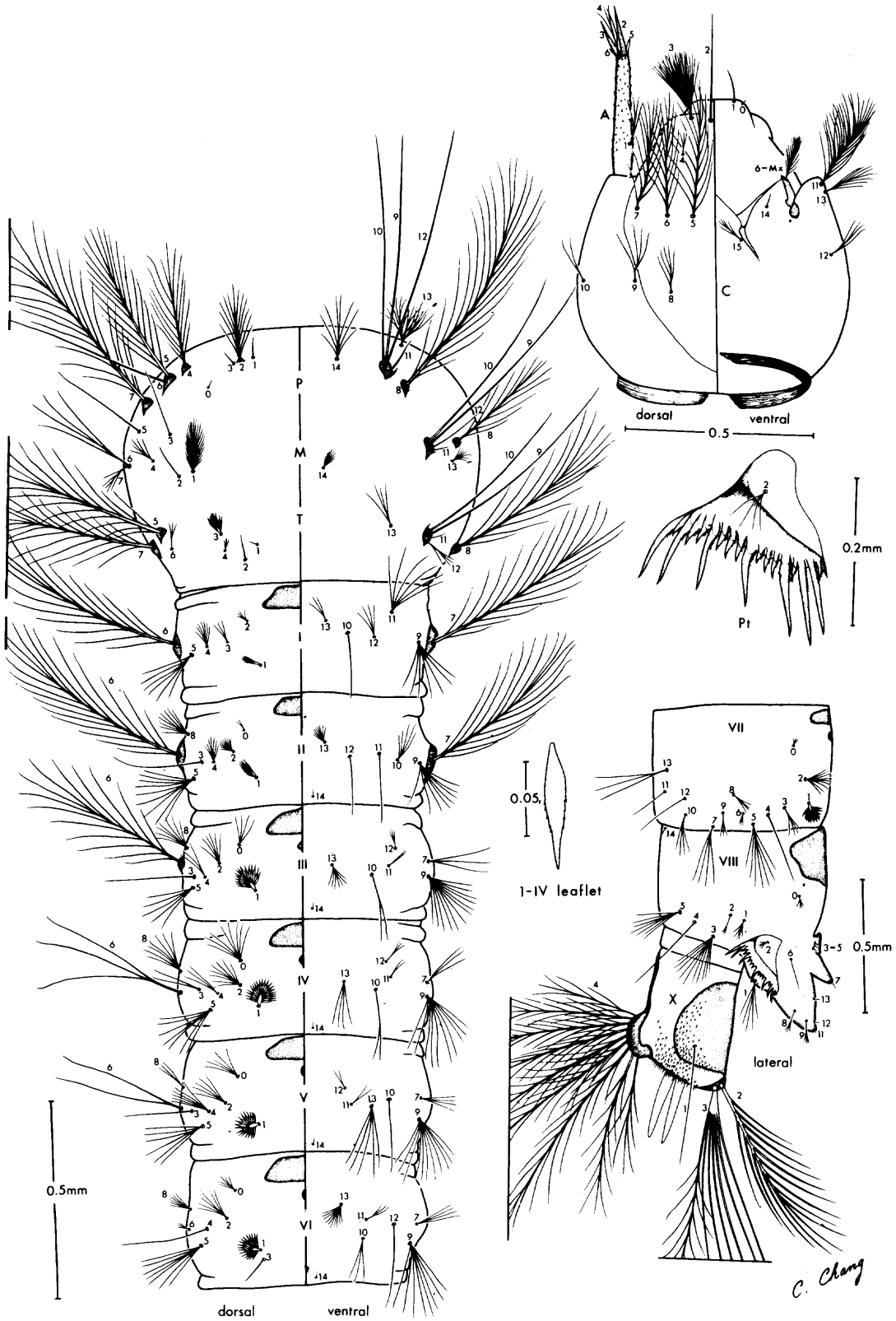

Figure 7. Anopheline larva with setae labelled (Diagrama de larva anofelina con nombres de cerdas).

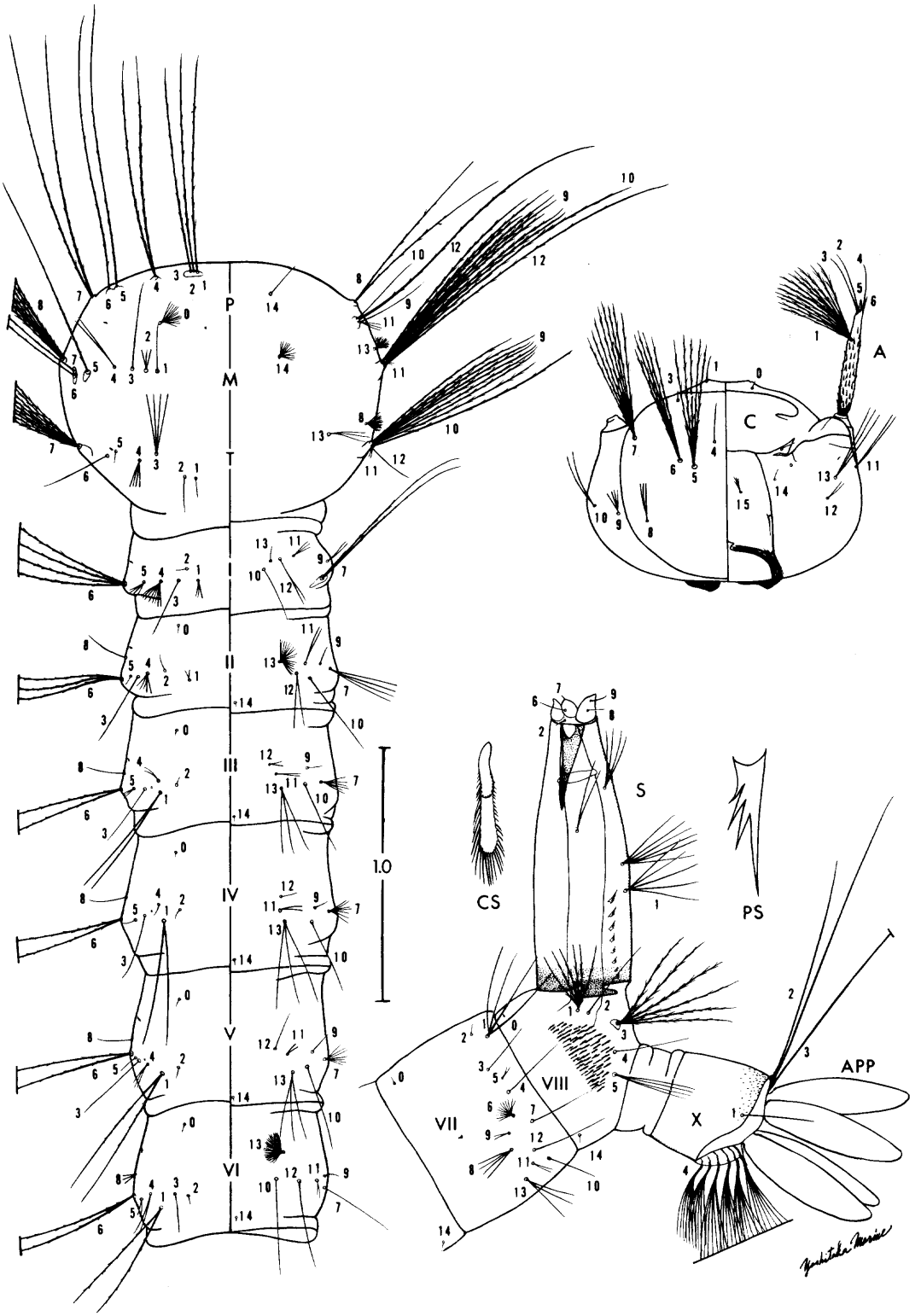

Figure 8. Culicine larva with setae labelled (Diagrama de larva culicina con nombres de cerdas). A - Antenna, antena; APP - anal papilla, papila anal; CS - comb scale, diente de piene; PS - pecten spine, espina del pécten; S - siphon, sifón.

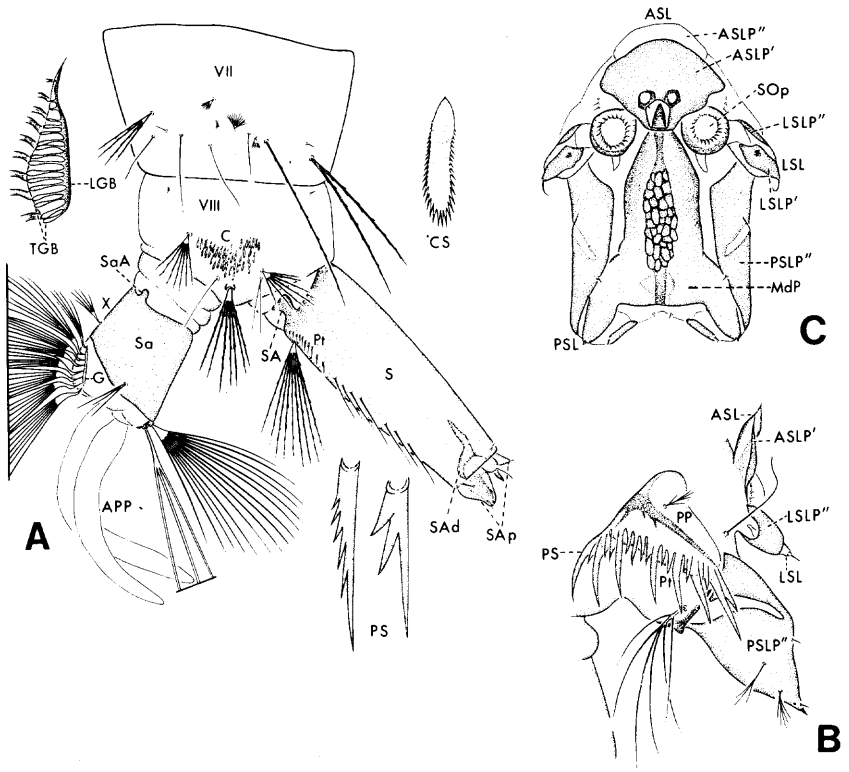

Figure 9. A. terminal segments of larva of *Culiseta* sp. (A. Segmentos terminales de larva de *Culiseta* sp.); B. lateral view and C. dorsal view of the spiracular apparatus of anopheline larva (B. vista lateral y C. vista dorsal del aparato espiracular de larva anofelina).

APP - anal papilla, papila anal
ASL - anterior spiracular lobe, lóbulo espiracular anterior
ASLP - anterior spiracular lobe plate, placa de lóbulo espiracular anterior
CS - comb scale, diente de piene
G - grid, red
LGB - lateral grid bar, barra lateral de la red
LSL - anterolateral spiracular lobe, lóbulo espiracular anterolateral
LSLP - anterolateral spiracular lobe plate, placa de lóbulo espiracular anterolateral
MdP - median spiracular plate, placa espiracular mediana
PP - pecten plate, placa del pécten
PS - pecten spine, espina del pécten
PSL - posterolateral spiracular lobe, lóbulo espiracular posterolateral
PSLP - posterolateral spiracular lobe plate, placa de lóbulo espiracular posterolateral
Pt - pecten, pécten
S - siphon, sifón
SA - siphon acus, acus del sifón
Sa - saddle, silla de montar
SaA - saddle acus, acus de la silla de montar
Sad - spiracular apodeme, apodemo del espiráculo
SAp - spiracular apparatus, aparato espiracular
SOp - spiracular opening, abertura espiracular
TGB - transverse grid bar, barra transversal de la red

KEY TO THE FOURTH STAGE LARVAE OF THE MOSQUITOES OF GUATEMALA

KEY TO GENERA

1. Abdominal segment VIII without siphon; usually some abdominal segments with seta 1 palmate 2
   Abdominal segment VIII with siphon; abdominal segments without seta 1 palmate 3

2(1). Anterior lobe of spiracular apparatus bearing long process, ending in long seta; seta 1 on abdominal segments III-V palmate, with leaflets racket-shaped . . . . . *Chagasia bathana*
   Anterior lobe of spiracular apparatus without long process; seta 1 on abdominal segments III-V hair-like or palmate, if palmate leaflets spindle-shaped . . . . . *Anopheles*

3(1). Seta 4-X composed of 1 pair of setae 4
   Seta 4-X composed of at least 4 pairs of fanlike setae, forming ventral brush 10

4(3). Maxilla body with long tooth-like process, modified for grasping. . 5
   Maxilla body without long process 8

5(4). Head capsule with short to long, transverse slit-like occipital foramen, not bounded by distinct collar 6
   Head capsule with normal circular occipital foramen, bounded by distinct collar 7

6(5). Maxillary process not articulating with body, not moveable; maxillary palpus short, protruding from lateral aspect . .*Sabethes*
   Maxillary process articulating with body, moveable; maxillary palpus a long appendage, attached at base . . . . . *Runchomyia*

7(5). Siphon with long row of multibranched accessory midventral setae; maxilla without strong articulation to head capsule far ventrad of palpus; seta 8-M strongly developed . . . . . *Johnbelkinia ulopus*
   Siphon without accessory midventral setae, or if present, all short, single; maxilla with strong articulation to head far ventrad of palpus; seta 8-M weak . . . . . *Shannoniana moralesi**

8(4). Mandible large and conspicuous, extending laterally near to level of base of antenna; seta 8-M absent . . .*Trichoprosopon digitatum*
   Mandible small, not extending laterally near to level of base of antenna; seta 8-M present 9

9(8). Seta 4 as long as seta 3 on abdominal segment X; siphon setae mostly with 3 or more branches . . . . . *Limatus*
   Seta 4 shorter than seta 3 on X; siphon setae mostly single. .*Wyeomyia*

*Larvae of other species known to belong to *Shannoniana* are as yet undescribed.

10(3). Siphon short, attenuated apically, fitted for piercing plant tissue 11
Siphon more or less cylindrical, not attenuated apically 12

11(10). Saddle of segment X without long setae ventrally; setae 2-, 3-A short, part of antenna distal to their point of attachment longer than part basal to it . . . . . *Coquillettidia nigricans**
Saddle with 3-4 long setae ventrally; setae 2-, 3-A as long as part of antenna distal to their point of attachment, this part no longer than basal part . . . . . *Mansonia*

12(10). Siphon without pecten 13
Siphon with pecten 15

13(12). Abdominal setae in groups of 3-5 on large setal support plates; lateral palatal brushes reduced to about 12 stout rods; comb scales absent on abdominal segment VIII . . . . . *Toxorhynchites*
Abdominal setae arising separately, rarely borne on setal support plates; lateral palatal brushes with at least 40 thin simple or pectinate filaments; comb scales present on VIII . . 14

14(13). Antenna simple, much shorter than head capsule; siphon glabrous . . . . . *Orthopodomyia kummi*
Antenna strongly curved and longer than head capsule; siphon pilose . . . . . *Aedeomyia squamipennis*

15(12). Comb scales arising from large comb plate on abdominal segment VIII; head longer than wide . . . . . *Uranotaenia*
Comb scales usually not attached to comb plate, if so, plate very small; head wider than long 16

16(15). Siphon with only 1 pair of setae, in addition to seta 2-S, without long filamentous spicules 17
Siphon with 3 or more pairs of setae in addition to 2-S, OR with row of long filamentous spicules 21

17(16). Ventral brush of segment X usually with at least 4 precratal setae attached to complete saddle, if saddle incomplete, precratal setae extending to basal 0.5 of segment. . . *Psorophora*
Ventral brush of segment X without precratal setae attached to saddle when complete, if incomplete, precratal setae confined to apical 0.33 of segment 18

18(17). Saddle completely encircling segment X . . . . . .(in part) *Aedes*
Saddle not completely encircling segment X 19

19(18). Seta 3-VII medium to thin and short; posterior margin of saddle with short spicules or none . . . . . (in part) *Aedes*
Seta 3-VII long and stout; posterior margin of saddle with long spicules 20

*Larva of *Cq. venezuelensis* not adequately described.

20(19). Seta 9-III-V shorter and weaker than seta 7-III-V; seta 12-I usually present . . . . . *Haemagogus*
Seta 9-III-V subequal to or longer and stronger than seta 7-III-V; seta 12-I absent . . . . . *Aedes(Howardina)*

21(16). Head capsule widest near level of antennae; 2 small sclerites present on segment X . . . . . *Deinocerites*
Head capsule widest in caudal 0.5; 1 large saddle sclerite present on X 22

22(21). Siphon with 1 pair of setae near base, pecten followed by row of closely spaced long filamentous spicules . . *Culiseta particeps*
Siphon without pair of setae near base, pecten followed by 3 or more setae, usually widely spaced . . . . . *Culex*

KEY TO SPECIES OF GENUS *AEDES**

1. Anal segment completely encircled by saddle 2
Anal segment not completely encircled by saddle 10

2(1). Siphon with pecten spines more widely spaced distally . . . *fulvus*
Siphon with pecten spines more or less evenly spaced 3

3(2). Anal papillae long, several times longer than anal segment. *hastatus*
Anal papillae almost as long as anal segment or shorter 4

4(3). Comb scales on VIII in single row of 12 or fewer 5
Comb scales on VIII numbering more than 12 and usually in irregular double row or triangular patch 6

5(4). Seta 1 of siphon attached distal to apex of pecten . . . . *serratus*
Seta 1 of siphon attached proximal to apex of pecten . . . *tormentor*

6(4). Seta 6 on abdominal segments III-V with 2-5 branches..*taeniorhynchus*
Seta 6 on segments III-V single, rarely double 7

7(6). Seta 1 of siphon attached proximal to apex of pecten . . *bimaculatus*
Seta 1 of siphon attached distal to apex of pecten 8

8(7). Seta 3-P at least double . . . . . *scapularis*
Seta 3-P single 9

9(8). Seta 1-IV,V usually single . . . . . *euplocamus*
Seta 1-V double; seta 1-IV usually double . . . . . *angustivittatus*

10(1). Seta 1 of siphon attached proximal to apex of pecten . . . *epactius*
Seta 1 of siphon attached distal to apex of pecten 11

11(10). Subapical spinules of comb scales on VIII large . . . . . *aegypti*
Subapical spinules of comb scales on VIII small 12

*Larva of *Ae. guatemala* unknown.

12(11). Saddle with at most small spicules along posterior margin . . 13
Saddle with very large spines along posterior margin 18

13(12). Siphon with pecten teeth more widely spaced distally . . . *vexans*
Siphon with pecten teeth more or less evenly spaced 14

14(13). Antenna spiculose, seta 1-A multibranched . . . . . *fluviatilis*
Antenna smooth, seta 1-A simple 15

15(14). Seta 5-C usually with 4 or more branches and/or seta 14-P branched . . . . . *daryi*
Seta 5-C usually single to triple and seta 14-P usually single at least on one side 16

16(15). Seta 14-C and seta 6-MP usually single, rarely branched, when branched generally divided about 0.25 from base; seta 11-P less than 0.5 length of 14-P; seta 6-C usually single, sometimes double . . . . . *homoeopus*
impostor
podographicus
Seta 14-C and 6-MP usually branched, rarely single; seta 11-P generally at least 0.5 length of 14-P; seta 6-C with 2-4 branches 17

17(16). Comb scales 22-38, with moderate-sized spine at apex . . . *sandrae*
Comb scales 40-100, with subequal spinules at apex . . . *insolitus*

18(12). Seta 4-X with 6 pairs setae . . . . . *quadrivittatus*
Seta 4-X with 5 pairs of setae 19

19(18). Thoracic and abdominal integument densely spiculate. . *sexlineatus*
Thoracic integument smooth, abdominal segments with small dorsal and ventral patches of fine spicules 20

20(19). Saddle with prominent spicules ventral to attachment of seta 1-X . . . . . *allotecnon*
Saddle without prominent spicules ventral to attachment of seta 1-X . . . . . *guerrero*

KEY TO SPECIES OF GENUS *ANOPHELES*

1. Setae 5-7-C simple 2
Setae 5-7-C plumose 3

2(1). Setae 1 and 13 on abdominal segments II-VI stellate, with long branches . . . . . *xelajuensis*
Seta 1-II-VI palmate; seta 13-II-VI normal, multibranched. .*neivai*

3(1). Posterolateral spiracular lobe with seta 13 extremely long or lobe produced into long process 4
Posterolateral spiracular lobe with seta 13 small to medium, lobe not prolonged 5

4(3). Posterolateral spiracular lobe produced into long process, seta 13 short; seta 1-P with 1-3 branches . . *pseudopunctipennis*
Posterolateral spiracular lobe not produced into long process, seta 13 extremely long; seta 1-P with 6 or more branches . . . . . *darlingi*

5(3). Seta 3-C with 4 or more branches 6
Seta 3-C single or double 10

6(5). Seta 3-C with 20 or more branches; seta 0-IV,V large, with 4 or more branches, equal in size to 2-IV,V . . . . . *crucians*
Seta 3-C with fewer than 15 branches; seta 0-IV,V minute, much smaller than 2-IV,V, simple 7

7(6). Setae 9,10,12-P unbranched; seta 3-C subequal in length to 2-C . . . . . *punctimacula*
Setae 9,10,12-P branched; seta 3-C distinctly shorter than 2-C. .8

8(7). Seta 2-C forked near apex; seta 6-IV,V simple . . . . *intermedius*
Seta 2-C unbranched; seta 6-IV,V with 2 or more branches 9

9(8). Large and small spines of pecten plate in regular alternating order; seta 3-C with 2 main branches, each subdivided apically . . . . . *gabaldoni*
Large and small spines of pecten plate alternating irregularly; seta 3-C with 4 or more long subdivided branches..*vestitipennis*

10(5). Seta 1 a well developed palmate seta on I-VII 11
Seta 1 a well developed seta on II-VII or III-VII 14

11(10). Seta 1-P plumose, not palmate; seta 9-P pectinate . . . *albimanus*
Seta 1-P palmate; seta 9-P simple 12

12(11). Setae 2,3-C branched, some divided dichotomously, beyond basal 0.33 . . . . . *oswaldoi*
Setae 2,3-C single, smooth or finely barbed 13

13(12). Alveoli of 2-C closer than width of 1 alveolus . . . . . *strodei*
Alveoli of 2-C separated by more than width of 1 alveolus..*allopha*

14(10). Seta 1-II-VII well developed palmate, 1-I hair-like or rudimentary palmate; setae 2-C very close together 15
Seta 1-III-VII well developed palmate, 1-I-II usually rudimentary, if developed, never equal in size to 1-III-VII; setae 2-C well separated 17

15(14). Seta 6-III simple, finely aciculate; seta 1-P with long stem and lateral branches . . . *parapunctipennis* var. *guatemalensis*
Seta 6-III plumose; seta 1-P with short stem and irradiating branches 16

16(15). Leaflets of palmate setae with serrate margins; seta 6-VI very short . . . . . *eiseni*
Leaflets of palmate setae with smooth margins; seta 6-VI very long . . . . . *argyritarsis*

17(14). Setae 2-C closer to setae 3-C than to each other; seta 6-IV,V plumose . . . . . *hectoris*
Setae 2-C closer to each other than to setae 3-C; seta 6-IV,V single to triple 18

18(17). Seta 2-C much stouter than 3-C; seta 9-P simple; seta 6-IV,V usually single . . . . . *neomaculipalpus*
Seta 2-C not much stouter than 3-C; seta 9-P branched; seta 6-IV,V usually double . . . . . *apicimacula*

KEY TO SUBGENERA OF GENUS *CULEX**

1. Head subquadrate; labrum produced in front, strongly developed and possessing stout denticles; lateral palatal brushes thickened and inserted in compact lateral group . . . . *Lutzia*
Head ovate; labrum not produced in front; lateral palatal brushes not thickened nor in compact lateral group 2

2(1). Seta 2-C strongly developed, always mesad of 1-C; comb scales usually in single row, if in small patch, then siphon with long subventral setae within pecten . . . . . *Carrollia*
Seta 2-C weakly developed, indistinct or absent, when present laterad of 1-C; comb scales forming triangular patch; subventral setae usually not within pecten 3

3(2). Posterolateral border of saddle with long slender spines. *Micraedes (erethyzonfer)*
Posterolateral border of saddle without spines or with only small inconspicuous spicules 4

4(3). Seta 3-P about same length and size as seta 1 on prothorax, usually at least 0.67 as long, both single . . . . . *Culex*
Seta 3-P thinner and shorter than 1-P, usually less than 0.5 its length, or setae 1 and 3 multibranched 5

5(4). Seta 4-X with several precratal setae; siphon without subdorsal setae distinctly above subventral setae . . . . . *Neoculex (derivator)*
Seta 4-X without precratal setae; siphon with 1 or more pairs of subdorsal setae distinctly above subventral setae 6

6(5). Siphonal seta 2-S strongly developed, curved and usually with recurved tooth on shaft; subdorsal setae on siphon conspicuous . . . . . *Melanoconion*
Siphonal seta 2-S inconspicuous, poorly developed; subdorsal setae on siphon less conspicuous . . . . . *Anoedioporpa*

*Key adapted from Berlin & Belkin (1980).

KEY TO SPECIES OF
SUBGENUS *ANOEDIOPORPA**

Seta 4-X with 6 pairs of setae; central tooth of dorsomentum not shouldered; seta 2-VIII on oval setal support plate . . . . . *restrictor*
Seta 4-X with 5 pairs of setae; central tooth of dorsomentum shouldered; seta 2-VIII without setal support plate. *conservator*

KEY TO SPECIES OF
SUBGENUS *CARROLLIA***

Seta 6-III-V single; seta 1-A multiple; seta 8-C single. . *bihaicola*
Seta 6-III-V branched; seta 1-A single; seta 8-C multiple . . . . . *metempsytus*

KEY TO SPECIES OF
SUBGENUS *CULEX****

1. Antenna uniform in shape, seta 1-A located near middle . . *corniger*
Antenna constricted distal to seta 1-A, which is attached near outer 0.3 2

2(1). Pecten spines extending distal to basal 0.5 of siphon . . . . . *interrogator*
Pecten spines restricted to basal 0.33 of siphon 3

3(2). Siphon with strong apical spines . . . . . *coronator*
Siphon without apical spines 4

4(3). Thorax minutely or coarsely aculeate 5
Thorax smooth 8

5(4). Siphon with 4 or more pairs of setae 6
Siphon with 3 pairs of setae 7

6(5). Siphon with 7-9 pairs of setae; 2 apicalmost pecten spines more widely spaced . . . . . *chidesteri*
Siphon with 4 pairs of setae; all pecten spines more or less evenly spaced . . . . . *nigripalpus*

7(5). Basalmost seta of siphon close to or proximal to apical pecten spine . . . . . *declarator*
Basalmost seta of siphon located well distad of apical pecten spine . . . . . *mollis*

8(4). Siphon with 5 or more pairs of setae 9
Siphon with fewer than 5 pairs of setae 10

*Key adapted from Berlin & Belkin (1980).
**Key adapted from Valencia (1973).
***Larvae of *Cx. ousqua* and *Cx. usquatus* unknown.

9(8). Most siphonal setae with 4 or more branches; anal papillae subequal in length to anal segment . . . . . *peus*
Most siphonal setae double; anal papillae 3 times length of anal segment . . . . . *stenolepis*

10(8). Some siphon setae with 4 or more branches . . . *quinquefasciatus*
Siphon setae single to triple 11

11(10). Setae 5,6-C with 5,6 branches . . . . . *thriambus*
Setae 5,6-C with 3,4 branches 12

12(11). Seta 4-C double . . . . . *pinarocampa*
Seta 4-C single . . . . . *inflictus*

KEY TO SPECIES OF
SUBGENUS *LUTZIA*

Pecten of siphon extending distad of middle . . . . . *bigoti*
Pecten not extending to middle of siphon . . . . . *allostigma*

KEY TO SPECIES OF
SUBGENUS *MELANOCONION**

1. Abdominal seta 7-I double 2
Abdominal seta 7-I single 4

2(1). Siphon index no greater than 5.0; most siphon setae much longer than width of siphon at point of attachment . . . . . *pilosus*
Siphon index greater than 8.0; most siphon setae no longer than width of siphon at point of attachment 3

3(2). Seta 1-M branched, about as long as seta 4-M; seta 6-I,II usually double . . . . . *taeniopus*
Seta 1-M single, much shorter than 4-M; seta 6-I,II triple..*pedroi*

4(1). Siphon index 8.0 or greater . . . . . *eastor*
Siphon index less than 8.0 5

5(4). Seta 4-P single 6
Seta 4-P double or triple 11

6(5). Thorax and abdomen densely aculeate, with numerous long hair-like aculeae 7
Thorax and abdomen weakly to moderately aculeate, with short aculeae 8

7(6). Seta 3-P double, about 0.5 length of setae 1,2-P . . . *chrysonotum*
Seta 3-P with 7,8 branches, less than 0.5 length of 1,2-P . . . . . *erraticus*

8(6). Seta 7-P double; seta 8-P single . . . . . *trifidus*
Seta 7-P triple; seta 8-P double 9

*The assistance of S. Sirivanakarn in preparing this key is acknowledged.

9(8). Seta 5-C with 4-7 branches; comb scales short, the fringed portion about as long as the base, with no elongated portion between . . . . . *bastagarius*
Seta 5-C with 1-3 branches; comb scales long, a narrow portion present between base and fringe 10

10(9). Abdomen aculeate on segments I-IV . . . . . *elevator*
Abdomen smooth on segments I-IV . . . . . *iolambdis*

11(5). Seta 4-P double; comb scales either all with prominent apical spine or all evenly fringed with subequal spinules 12
Seta 4-P triple; some comb scales with apical spine, some evenly fringed with subequal spinules 14

12(11). Comb scales with apical spine and small lateral spinules . *educator*
Comb scales evenly fringed with subequal spinules 13

13(12). Comb scales short, without narrow elongate central part, about 35 in number . . . . . *sardinerae*
Comb scales long, with narrow elongate central part, 45 or more in number . . . . . *conspirator*

14(11). Siphon with 7 pairs of setae . . . . . *paracrybda*
Siphon with 5 pairs of setae . . . . . *panocossa*

KEY TO SPECIES OF GENUS *DEINOCERITES*[*]

1. Seta 6-II single; seta 1-S usually with 4-6 branches (Pacific Coast) . . . . . *belkini*
Seta 6-II double; seta 1-S usually double or triple 2

2(1). Seta 9-P double or triple; seta 2-C inconspicuous, about 0.25-0.33 length of 1-C; seta 5-C usually double or triple (Atlantic Coast) . . . . . *epitedeus*
Seta 9-P single; seta 2-C at least 0.5 length of 1-C; seta 5-C usually 4-branched 3

3(2). Seta 6-C double or triple; seta 4-X with 7 pairs of setae (Pacific Coast) . . . . . *howardi*
Seta 6-C simple; seta 4-X with 6 pairs of setae 4

4(3). Seta 1-VIII usually with 5-7 branches; seta 1-VII usually long, frequently reaching base of siphon; seta 1-S reaching level of 1a-S (Pacific Coast) . . . . . *pseudes*
Seta 1-VIII usually with 3-4 branches; seta 1-VII shorter, never reaching base of siphon; seta 1-S not reaching level of 1a-S (Atlantic Coast) . . . . . *cancer*

[*]Key adapted from Adames (1971).

KEY TO SPECIES OF GENUS *HAEMAGOGUS**

1. Comb scales usually 5-12 (4-20) in single row; seta 4-X with 5 pairs (very rarely 6) of setae 2
   Comb scales usually 10-50 (6-75) in irregular double row or triangular patch; seta 4-X with 6 pairs of setae 4

2(1). Integument of body with aculeae . . . . . *mesodentatus*
   Integument of body smooth 3

3(2). Seta 12-I absent; siphon index 2.0 . . . . . *anastasionis*
   Seta 12-I present; siphon index 2.5-3.0 . . . . . *equinus*

4(1). Spines on caudal margin of saddle reduced, very short, each with multiple teeth; pecten extending to basal 0.45 of siphon . . . . . *aeritinctus*
   Spines on caudal margin of saddle stronger, several spines long, with single tooth; pecten extending about 0.5 of siphon . . . . . *regalis*

KEY TO SPECIES OF GENUS *LIMATUS***

Seta 4-X with 3-4 pairs of setae . . . . . *durhamii*
Seta 4-X with 7-8 pairs of setae . . . . . *asulleptus*

KEY TO SPECIES OF GENUS *MANSONIA****

Seta 4-X with 4 pairs of cratal setae . . . . . *titillans*
Seta 4-X with 3 pairs of cratal setae . . . . . *dyari*

KEY TO SPECIES OF GENUS *PSOROPHORA*****

1. Head quadrate; lateral palatal brushes composed of stout rods (subgenus *Psorophora*) 2
   Head ovate; lateral palatal brushes composed of many thin filaments 5

2(1). Siphon index 5.0 or greater; seta 1-S multibranched . . . *lineata*
   Siphon index 4.0 or less; seta 1-S single 3

3(2). Seta 1-X with 3-4 branches from near base . . . . . *ciliata*
   Seta 1-X single or forked beyond middle 4

*Key adapted from Arnell (1973).
**Key adapted from Lane (1953).
***Key adapted from Belkin et al. (1970).
****Larvae of *Ps. albipes* and *Ps. champerico* unknown.

4(3). Siphon index 4.0; pecten extending to no more than 0.5 of siphon . . . . . *howardii*
Siphon index 2.0 or less; pecten extending to apex of siphon . . . . . *cilipes*

5(1). Antenna shorter than length of head (subgenus *Grabhamia*) . . . . . *confinnis*
Antenna as long as or longer than length of head (subgenus *Janthinosoma*) 6

6(5). Antenna about as long as or rarely slightly longer than median length of head . . . . . *varipes*
Antenna distinctly longer than median length of head 7

7(6). Seta 1-X single . . . . . *lutzii*
Seta 1-X with 3 or more branches . . . . . *ferox*

KEY TO SPECIES OF
GENUS *RUNCHOMYIA**

Most comb scales attached to comb plate; seta 5-T strongly developed . . . . . *magna*
Comb scales not attached to comb plate; seta 5-T weakly developed . . . . . *espini*

KEY TO SPECIES OF
GENUS *SABETHES***

Siphon index 4.0-5.0; seta 1-X single . . . . . *cyaneus*
Siphon index 3.0; seta 1-X double . . . . . *chloropterus*

KEY TO SPECIES OF
GENUS *TOXORHYNCHITES****

Siphon index 3.5-4.0 . . . . . *haemorrhoidalis superbus*
Siphon index 1.5-2.0 . . . . . *theobaldi*

KEY TO SPECIES OF
GENUS *URANOTAENIA*****

1. Seta 6-I,II double 2
Seta 6-I,II triple 3

2(1). Seta 14-P multibranched . . . . . *coatzacoalcos*
Seta 14-P single . . . . . *lowii*

*Key adapted from Zavortink (1979a).
**Key adapted from Lane (1953). Larva of *Sa. tarsopus* unknown.
***Key adapted from Lane (1953). Larva of *Tx. grandiosus* unknown.
****Key adapted from Galindo et al. (1954). Larva of *Ur. orthodoxa* unknown.

3(1). Seta 14-P single . . . . . *geometrica*
Seta 14-P with 3 or more branches 4

4(3). Seta 4-C double, rarely triple; seta 7-C with 4 or 5 branches; seta 14-P with 6-7 branches . . . . . *socialis*
Seta 4-C with 4-5 branches; seta 7-C with 7-8 branches; seta 14-P with 3-6 branches . . . . . *pulcherrima*

KEY TO SPECIES OF GENUS *WYEOMYIA*

1. Siphon with spiniforms resembling pecten spines 2
Siphon without spiniforms 3

2(1). Siphon index 3.0 or less . . . . . *pseudopecten*
Siphon index more than 3.0 . . . . . *chalcocephala*

3(1). Comb scales on VIII attached to sclerotized plate . . *arthrostigma*
Comb scales not attached to plate 4

4(3). Siphon index greater than 5.0 5
Siphon index less than 5.0 7

5(4). Siphon with 2 pairs of 3-branched setae near base. . *celaenocephala*
Siphon without 2 pairs of 3-branched setae near base 6

6(5). Setae 5,6-C large, reaching beyond anterior border of head..*abebela*
Seta 5,6-C small, not reaching anterior border of head. .*melanopus*

7(4). Setae 2,3-X both single . . . . . *guatemala*
Setae 2,3-X at least 2-branched 8

8(7). Branches of seta 4-X as long as or longer than length of segment X . . . . . *hemisagnosta*
Branches of seta 4-X shorter than length of segment X. . .*aporonoma*

CLAVE PARA LA IDENTIFICACION DE LARVAS DE CUARTO ESTADIO DE LOS MOSQUITOS DE GUATEMALA

CLAVE GENERICA

1. Segmento abdominal VIII sin sifón; usualmente algunos segmentos abdominales con la cerda 1 palmeada 2
   Segmento abdominal VIII con sifón; segmentos abdominales sin cerdas palmeadas 3

2(1). Lóbulo anterior del aparato respiratorio modificado formando un filamento largo, con una cerda larga apicalmente; cerda 1 palmeada, con hojas individuales en forma de raqueta, presentes en los segmentos III-V . . . . . *Chagasia bathana*
   Lóbulo anterior del aparato respiratorio sin filamento; cerda 1 de los segmentos abdominales III-V en forma de pelo o palmeada, si es palmeada, hojas lanceoladas . . . . . *Anopheles*

3(1). Cerda 4-X formada de un solo par de cerdas 4
   Cerda 4-X formando una brocha con un mínimo de 4 pares de cerdas en posición ventral 10

4(3). Cuerpo de la maxila con proyección larga en forma de diente modificada para asir 5
   Maxila sin proyección larga 8

5(4). Cápsula cefálica con foramen occipital en forma de ranura, corta hasta larga, no limitado por un cuello 6
   Cápsula cefálica con foramen occipital circular, limitado por el cuello 7

6(5). Proceso maxilar inmóvil, no articulado con el cuerpo de la maxila; palpo maxilar corto, proyectado en aspecto lateral . . . . . *Sabethes*
   Proceso maxilar móvil, articulado con el cuerpo de la maxila; palpo maxilar formando apéndice largo adherido basalmente . . . . . *Runchomyia*

7(5). Sifón con región medioventral con larga fila de cerdas accesorias ramificadas; maxila sin articulación con cápsula cefálica ventralmente a los palpos; cerda 8-M muy desarrollada . . . . . *Johnbelkinia ulopus*
   Sifón sin cerdas accesorias en región medioventral, si presentes, son cortas e individuales; articulación de maxila con cápsula cefálica fuerte, ventralmente a los palpos; cerda 8-M poco desarrollada . . . . . *Shannoniana moralesi**

8(4). Mandíbula agrandada y conspicua extendiéndose lateralmente hasta cerca del nivel de base de las antenas; cerda 8-M ausente . . . . . *Trichoprosopon digitatum*
   Mandíbula pequeña, sin extensión lateral al nivel de la base de las antenas; cerda 8-M presente 9

*Larvas de las otras especies pertenecientes a *Shannoniana* no han sido descritas todavía.

9(8). Décimo segmento abdominal con cerda 4 tan larga como 3; cerdas sifonales con 3 o mas ramificaciones . . . . . *Limatus*
Décimo segmento abdominal con cerda 4 mas corta que 3; cerdas sifonales simples . . . . . .*Wyeomyia*

10(3). Sifón corto, atenuado en el extremo, modificado para penetrar el tejido de plantas 11
Sifón mas o menos cilíndrico, sin atenuación apical 12

11(10). Silla de montar del décimo segmento abdominal sin cerdas largas en posición ventral; cerdas 2, 3-A mas cortas que flagelómero distal y éste mas largo que segmento basal . . . . . .*Coquillettidia nigricans**
Silla de montar del segmento X con 3 ó 4 cerdas largas en posición ventral; cerdas 2, 3-A tan largas como flagelómero y éste casi igual que el segmento basal . . . . . *Mansonia*

12(10). Sifón sin pećten 13
Sifón con pećten 15

13(12). Cerdas abdominales en grupos de 3-5 partiendo de placas esclerotizadas grandes; cepillos palatinos laterales reducidos, formando aproximadamente 12 filamentos gruesos y simples; dientes del peine ausentes en VIII . . . . . .*Toxorhynchites*
Cerdas abdominales individuales sin placas esclerotizadas; cepillos palatinos laterales con por lo menos 40 filamentos delgados cilíndricos simples o pectinados; dientes del peine presentes en VIII 14

14(13). Antenas simples, mucho mas cortas que cápsula cefálica; superficie del sifón desnuda . . . . . *Orthopodomyia kummi*
Antenas fuertemente curvadas y mas largas que cápsula cefálica; superficie del sifón pilosa . . . . . *Aedeomyia squamipennis*

15(12). Dientes del peine partiendo de placa esclerotizada grande del segmento abdominal VIII; cabeza mas larga que ancha . . . . . *Uranotaenia*
Dientes del peine sin placa en VIII, si presente, es muy reducida; cabeza mas ancha que larga 16

16(15). Sifón con un solo par de cerdas además de las cerdas 2-S, sin fila de espiculas largas y filamentosas 17
Sifón con 3 o mas pares de cerdas además de 2-S o con fila de espiculas largas y filamentosas 21

*Larva de *Cq. venezuelensis* está inadecuadamente descrita.

17(16). Brocha ventral del segmento anal usualmente con mínimo de 4 cerdas unidas a la silla de montar completa, si la silla está incompleta, cerdas se extienden hasta la mitad basal del segmento . . . . . *Psorophora*
Brocha ventral sin cerdas unidas cuando silla de montar está completa, cuando está incompleta, cerdas están en tercio apical del segmento 18

18(17). Silla de montar rodea completamente el segmento abdominal X . . . . . (una parte) *Aedes*
Silla de montar no rodea el segmento X 19

19(18). Cerda 3-VII mediana hasta pequeña y corta; borde posterior de silla de montar con espinas pequeñas o sin ellas . . . . . (una parte) *Aedes*
Cerda 3-VII larga y gruesa; márgen posterior de silla de montar con espinas largas 20

20(19). Cerda 9-III-V mas corta y delgada que cerda 7-III-V; cerda 12-I usualmente presente . . . . . *Haemagogus*
Cerda 9-III-V igual o mas larga y gruesa que cerda 7-III-V; 12-I ausente . . . . . *Aedes* (*Howardina*)

21(16). Parte mas ancha de la cabeza es anterior al nivel de las antenas; segmento abdominal X con 2 escleritos pequeños . . . . . *Deinocerites*
Parte mas ancha de la cabeza es la mitad caudal, detrás de los ojos; segmento X con silla de montar grande. 22

22(21). Sifón con un par de cerdas cerca de base; espinas del pécten seguidas por fila de espiculas largas y filamentosas poco espaciadas entre si. . . . . *Culiseta particeps*
Sifón sin cerdas cerca de la base; espinas del pécten seguidas por fila de 3 o mas cerdas usualmente bastante espaciadas. . . . . *Culex*

CLAVE PARA ESPECIES DEL GENERO *AEDES**

1. Segmento anal rodeado por silla de montar 2
Segmento anal no completamente rodeado por silla de montar . . .10

2(1). Sifón con espinas del pécten muy separadas distalmente . . .*fulvus*
Sifón con espinas del pécten mas o menos uniformemente espaciadas 3

3(2). Papilas anales largas, varias veces mas largas que segmento anal . . . . . *hastatus*
Papilas anales mas cortas o casi tan largas como el segmento anal 4

*Larva de *Ae. guatemala* desconocida.

4(3). Dientes del peine en VIII 12 o menos, formando una fila simple 5
Dientes del peine mas de 12 y usualmente en fila irregular doble o formando un parche triangular 6

5(4). Cerda 1 del sifón unida distalmente al ápice del pécten. .*serratus*
Cerda 1 del sifón unida proximalmente al ápice del pecten . . . . . .*tormentor*

6(4). Cerda 6 de segmentos abdominales III-V con 2-5 ramificaciones . . . . . *taeniorhynchus*
Cerda 6 en III-V sin ramificaciones (raramente dobles) 7

7(6). Cerda 1 del sifón unida proximalmente al ápice del pécten . . . . . *bimaculatus*
Cerda 1 del sifón unida distalmente al ápice del pécten 8

8(7). Cerda 3-P por lo menos con 2 ramificaciones . . . . . *scapularis*
Cerda 3-P simple 9

9(8). Cerda 1-IV-V usualmente simple . . . . . *euplocamus*
Cerda 1-V con 2 ramificaciones; cerda 1-IV usualmente con 2 ramificaciones . . . . . *angustivittatus*

10(1). Cerda 1 del sifón unida proximalmente al ápice del pécten . . . . . *epactius*
Cerda 1 del sifón unida distalmente al ápice del pécten 11

11(10). Espinas subapicales de los dientes del peine en VIII grandes . . . . . *aegypti*
Espinas subapicales de los dientes del peine pequeñas 12

12(11). Silla de montar con espinas pequeñas a lo largo del márgen posterior 13
Silla de montar con espinas muy grandes a lo largo del márgen posterior 18

13(12). Sifón con espinas del pécten muy separadas distalmente. . . *vexans*
Sifón con espinas del pécten mas o menos uniformemente espaciadas 14

14(13). Antenas espiculosas; cerda 1-A multiramificada. . . . .*fluviatilis*
Antenas lisas; cerda 1-A sin ramificaciones 15

15(14). Cerda 5-C usualmente con 4 o mas ramificaciones y/o cerda 14-P ramificada . . . . . *daryi*
Cerda 5-C usualmente con 1-3 ramificaciones y cerda 14-P usualmente simple, al menos de un lado 16

16(15). Cerdas 14-C y 6-MP usualmente sin ramificaciones, cuando ramificadas usualmente ramas comienzan a 0.25 de la base; longitud de 11-P menos de la mitad de 14-P; 6-C usualmente sin ramas, a veces doble . . . . . *homoeopus impostor podographicus*

Cerda 14-C y 6-MP usualmente ramificadas; longitud de 11-P usualmente 0.5 de 14-P; 6-C con 2-4 ramas 17

17(16). Dientes del peine 22-38 con espina de tamaño moderado en el ápice . . . . . *sandrae*

Dientes del peine 40-100 con espinas pequeñas en el ápice . . . . . *insolitus*

18(12). Brocha ventral con 6 pares de cerdas . . . . . *quadrivittatus*

Brocha ventral con 5 pares de cerdas 19

19(18). Integumento del tórax y abdómen densamente espiculado . . . . . *sexlineatus*

Integumento del tórax liso, segmentos abdominales con parches pequeños de espiculas en posición dorsal y ventral 20

20(19). Silla de montar con espiculas prominentes ventrales al punto de salida de cerda 1-X . . . . . *allotecnon*

Silla de montar sin espiculas ventrales al punto de salida de cerda 1-X . . . . . *guerrero*

CLAVE PARA ESPECIES DEL GENERO *ANOPHELES*

1. Cerdas 5,6,7-C sin ramificaciones 2

Cerdas 5,6,7-C plumosas 3

2(1). Cerda 1 y 13 de los segmentos II-VI con forma estrellada y ramas largas . . . . . *xelajuensis*

Cerda 1 en II-VI palmeada; cerda 13 en II-VI de forma normal con varias ramificaciones . . . . . .*neivai*

3(1). Lóbulo espiracular posterolateral formando proyección larga o cerda 13 muy larga 4

Lóbulo espiracular posterolateral simple, cerda 13 pequeña hasta mediana 5

4(3). Lóbulo espiracular posterolateral formando una proyección larga, cerda 13 corta; cerda 1-P con 1-3 ramificaciones. . . . . *pseudopunctipennis*

Lóbulo espiracular posterolateral simple, no formando proyección, cerda 13 extremadamente larga; cerda 1-P con 6 o mas ramificaciones. . . . . *darlingi*

5(3). Cerda 3-C con 4 o mas ramificaciones 6

Cerda 3-C simple o doble 10

6(5). Cerda 3-C con 20 o mas ramificaciones; cerdas O-IV,V grandes, con 4 o mas ramificaciones,iguales en tamaño a las cerdas 2-IV,V . . . . . *crucians*
Cerda 3-C con menos de 15 ramificaciones; cerdas O-IV,V mucho mas pequeñas que 2-IV,V y sin ramificaciones 7

7(6). Cerdas 9,10,12-P sin ramificaciones; cerda 3-C casi del mismo tamaño que 2-C . . . . . *punctimacula*
Cerdas 9,10,12-P ramificadas; cerda 3-C notablemente mas corta que 2-C 8

8(7). Cerda 2-C bifurcada cerca del ápice; cerda 6-IV,V sin ramificaciones . . . . . *intermedius*
Cerda 2-C sin ramificaciones; cerda 6-IV,V con 2 o mas ramificaciones 9

9(8). Espinas grandes y pequeñas de la placa del pécten alternadas regularmente; cerda 3-C con dos ramas largas principales cada una subdividida apicalmente . . . . . *gabaldoni*
Espinas grandes y pequeñas de la placa del pécten alternadas irregularmente; cerda 3-C con 4 o mas ramas largas subdivididas . . . . . *vestitipennis*

10(5). Cerda 1 de los segmentos abdominales I-VII de forma palmeada 11
Cerda 1 palmeada en segmentos abdominales II-VII o III-VII . . . 14

11(10). Cerda 1-P plumosa, no palmeada; cerda 9-P pectinada . . . *albimanus*
Cerda 1-P palmeada; cerda 9-P simple 12

12(11). Cerdas 2,3-C ramificadas, con algunas ramas dicotómicas, partiendo arriba del tercio basal . . . . . *oswaldoi*
Cerdas 2,3-C simples lisas o con prolongaciones muy finas . . . 13

13(12). Distancia entre los alveolos de 2-C mas pequeña que el ancho de un alveolo . . . . . *strodei*
Distancia entre los alveolos de 2-C mas grande que el ancho de un alveolo . . . . . *allopha*

14(10). Cerda 1-II-VII muy desarrollada y de forma palmeada; cerda 1-I en forma de pelo o rudimentariamente palmeada; cerdas 2-C muy juntas 15
Cerda 1-III-VII muy desarrollada y de forma palmeada; cerda 1-I,II usualmente rudimentaria, si están desarrolladas son mas pequeñas que las cerdas 1-III-VII; cerdas 2-C separadas 17

15(14). Cerda 6-III sin ramificaciones, finamente aciculada; cerda 1-P con tronco largo y ramas laterales . . . . . *parapunctipennis* var. *guatemalensis*
Cerda 6-III plumosa; cerda 1-P con tronco corto y ramas que parten en todas direcciones 16

16(15). Hojillas de cerdas palmeadas con márgenes serrados; cerda 6-VI muy corta . . . . . *eiseni*
Hojillas de cerdas palmeadas con márgenes lisos; cerda 6-VI muy larga . . . . . *argyritarsis*

17(14). Cerdas 2-C mas cerca a cerdas 3-C que entre ellas; cerdas 6-IV,V plumosas . . . . . *hectoris*
Cerdas 2-C mas cerca entre si que a cerdas 3-C; cerdas 6-IV,V simples hasta triples 18

18(17). Cerda 2-C mas gruesa que 3-C; cerda 9-P sin ramificaciones; cerdas 6-IV,V usualmente simples . . . . . *neomaculipalpus*
Cerda 2-C no mas gruesa que 3-C; cerda 9-P ramificada; cerdas 6-IV,V usualmente dobles . . . . . *apicimacula*

CLAVE PARA LOS SUBGENEROS DEL GENERO *CULEX**

1. Cabeza cuadrada; labro muy desarrollado anteriormente con dientecillos gruesos; cepillos palatinos laterales engrosados e insertados formando un grupo lateral compacto . *Lutzia*
Cabeza ovalada; labro normal no desarrollado anteriormente; cepillos palatinos laterales no engrosados 2

2(1). Cerda 2-C fuertemente desarrollada, colocada mesalmente a 1-C; dientes del peine usualmente en una sola fila, si forman un parche, el sifón presenta penachos subventrales largos en el área del pécten . . . . . *Carrollia*
Cerda 2-C poco desarrollada o ausente, si presente, está colocada lateralmente a 1-C; dientes del peine formando un parche triangular; penachos subventrales usualmente fuera del área del pécten 3

3(2). Márgen posterolateral de silla de montar con espinas largas y delgadas . . . . . *Micraedes (erethyzonfer)*
Márgen posterolateral de silla de montar sin espinas o con espiculas pequeñas 4

4(3). Cerda 3-P aproximadamente del mismo tamaño y longitud que 1-P, al menos de 0.67 del largo de 1-P, ambas simples . . . . *Culex*
Cerda 3-P mas corta y delgada que 1-P, usualmente de menos de 0.5 la longitud de 1-P, o cerdas 1,3-P con varias ramificaciones 5

*Clave adaptada de Berlin y Belkin (1980).

5(4). Cerda 4-X con varias cerdas adheridas anteriormente a la red del segmento; sifón sin cerdas subdorsales colocados arriba de los cerdas subventrales . . . . . *Neoculex (derivator)*

Cerda 4-X sin cerdas adheridas anteriormente a la red; sifón con uno o mas pares de cerdas subdorsales colocados arriba de los cerdas subventrales 6

6(5). Cerda sifonal 2-S muy desarrollada, curvada y usualmente con diente curvo cerca de base; sifón con cerdas subdorsales muy visibles . . . . . *Melanoconion*

Cerda 2-S poco desarrollada; sifón con cerdas subdorsales poco visibles . . . . . *Anoedioporpa*

CLAVE PARA ESPECIES DEL SUBGENERO *ANOEDIOPORPA**

Cerda 4-X con 6 pares de cerdas; diente central del dorsomento con márgen parejo, sin proyección apical; cerda 2-VIII partiendo de una placa esclerotizada ovalada . . . *restrictor*

Cerda 4-X con 5 pares de cerdas; diente central del dorsomento con proyección apical; cerda 2-VIII sin placa esclerotizada en la base . . . . . *conservator*

CLAVE PARA ESPECIES DEL SUBGENERO *CARROLLIA***

Cerda 6 en los segmentos abdominales III-V sin ramificaciones; cerda 1-A con ramificaciones múltiples; cerda 8-C simple . . . . . *bihaicola*

Cerda 6 en III-V con ramificaciones; cerda 1-A simple; cerda 8-C múltiple . . . . . *metempsytus*

CLAVE PARA ESPECIES DEL SUBGENERO SUBGENERO *CULEX****

1. Antenas de forma regular, localización de cerda 1-A cerca del medio . . . . . *corniger*

Antena con constricción después de cerda 1-A, colocada en tercio distal de la antena 2

2(1). Espinas del pécten extendiéndose mas allá de la mitad basal del sifón . . . . . *interrogator*

Espinas del pécten restringidas al tercio basal del sifón . . . 3

*Clave adaptada de Berlin & Belkin (1980).
**Clave adaptada de Valencia (1973).
***Larvas de *Cx. ousqua* y *Cx. usquatus* desconocidas.

3(2). Sifón con espinas apicales gruesas . . . . . *coronator*
Sifón sin espinas apicales 4

4(3). Tórax cubierto con espiculas pequeñas o grandes 5
Tórax liso 8

5(4). Sifón con 4 o mas pares de cerdas 6
Sifón con 3 pares de cerdas 7

6(5). Sifón con 7-9 pares de cerdas; las 2 últimas espinas del pécten mas separadas entre si que las demás . . . . . *chidesteri*
Sifón con 4 pares de cerdas; las espinas del pécten distribuidas uniformemente . . . . . *nigripalpus*

7(5). Ultima cerda basal del sifón colocada cerca o en posición proximal a la espina apical del pécten . . . . . *declarator*
Ultima cerda basal del sifón colocada en posición distal a la espina apical del pécten . . . . . *mollis*

8(4). Sifón con 5 o mas pares de cerdas 9
Sifón con menos de 5 pares de cerdas 10

9(8). La mayoría de las cerdas sifonales con 4 o mas ramificaciones; papila anal casi del mismo largo que segmento anal . . . *peus*
La mayoría de las cerdas sifonales con 2 ramificaciones; papila anal 3 veces mas larga que segmento anal . . .*stenolepis*

10(8). Algunas de las cerdas sifonales con 4 o mas ramificaciones . . . . . *quinquefasciatus*
Cerdas sifonales con 1-3 ramificaciones 11

11(10). Cerdas 5,6-C con 5,6 ramificaciones . . . . . *thriambus*
Cerdas 5,6-C con 3,4 ramificaciones 12

12(11). Cerda 4-C doble . . . . . *pinarocampa*
Cerda 4-C simple . . . . . *inflictus*

CLAVE PARA ESPECIES DEL SUBGENERO *LUTZIA*

Pécten extendiéndose mas allá de 0.5 sobre el sifón . . . *bigoti*
Pécten no llega hasta la mitad del sifón . . . . . *allostigma*

CLAVE PARA ESPECIES DEL SUBGENERO *MELANOCONION**

1. Cerda abdominal 7-I doble 2
Cerda abdominal 7-I simple 4

*Se hace constar la asistencia de S. Sirivanakarn en la preparación de esta clave.

2(1). Indice sifonal no mayor que 5.0; la mayoría de cerdas del sifón mucho mas largas que el ancho del mismo en el punto de partida . . . . . *pilosus*
Indice sifonal mayor que 8.0; mayoría de cerdas del sifón no mas largas que el ancho del sifón en el punto de partida 3

3(2). Cerda 1-M ramificada, casi tan larga como 4-M; 6-I-II usualmente dobles . . . . . *taeniopus*
Cerda 1-M simple, mucho mas corta que 4-M; 6-I-II triples . *pedroi*

4(1). Indice sifonal 8.0 o mas . . . . . *eastor*
Indice sifonal menos de 8.0 5

5(4). Cerda 4-P sin ramificaciones 6
Cerda 4-P doble o triple 11

6(5). Tórax y abdómen densamente espiculados, con espiculas largas y piliformes 7
Tórax y abdómen débil hasta moderadamente espiculado, con espiculas cortas 8

7(6). Cerda 3-P doble y de 0.5 la longitud de 1,2-P . . . . .*chrysonotum*
Cerda 3-P con 7-8 ramificaciones, de menos de 0.5 la longitud de 1,2-P . . . . . *erraticus*

8(6). Cerda 7-P doble; 8-P simple . . . . . *trifidus*
Cerda 7-P triple; 8-P doble 9

9(8). Cerda 5-C con 4-7 ramificaciones; dientes del peine cortos, la porción con flecos casi tan larga como la base, sin porción elongada en el medio . . . . . .*bastagarius*
Cerda 5-C con 1-3 ramificaciones; dientes del peine largos, con porción elongada entre la base y los flecos 10

10(9). Abdómen espiculado en los primeros 4 segmentos . . . . . .*elevator*
Abdómen desnudo en estos segmentos . . . . . *iolambdis*

11(5). Cerda 4-P doble; todos los dientes del peine con espina apical prominente o con flecos de espinas delgadas iguales . . .12
Cerda 4-P triple; algunos dientes del peine con espina apical, otros con flecos de espinas iguales 14

12(11). Dientes del peine con espina apical y espinas laterales pequeñas . . . . . *educator*
Dientes del peine con flecos parejos con espinas pequeñas en posición apical 13

13(12). Dientes del peine cortos sin parte central delgada y elongada, 35 mas o menos . . . . . *sardinerae*
Dientes del peine largos con parte central delgada y elongada, 45 o mas . . . . . .*conspirator*

14(11). Sifón con 7 pares de cerdas . . . . . *paracrybda*
Sifón con 5 pares de cerdas . . . . . .*panocossa*

CLAVE PARA ESPECIES DEL GENERO *DEINOCERITES**

1. Cerda 6-II simple; cerda 1-S usualmente con 4-6 ramificaciones (Costa Pacífica) . . . . . *belkini*
Cerda 6-II doble; cerda 1-S usualmente doble o triple 2

2(1). Cerda 9-P doble o triple; cerda 2-C inconspicua y midiendo 0.25-0.33 del largo de cerda 1-C; cerda 5-C usualmente doble o triple (Costa Atlántica). . . . . *epitedeus*
Cerda 9-P simple; cerda 2-C por lo menos 0.5 del largo de cerda 1-C; cerda 5-C usualmente con 4 ramificaciones 3

3(2). Cerda 6-C doble o triple; cerda 4-X con 7 pares de cerdas (Costa Pacífica) . . . . . *howardi*
Cerda 6-C simple; cerda 4-X con 6 pares de cerdas 4

4(3). Cerda 1-VIII usualmente con 5-7 ramificaciones; cerda 1-VII usualmente larga, frecuentemente llegando hasta el sifón; cerda 1-S llegando hasta base de la-S (Costa Pacífica)..*pseudes*
Cerda 1-VIII usualmente con 3,4 ramificaciones; cerda 1-VII corta, nunca llegando hasta base del sifón; cerda 1-S no llega a base de la-S (Costa Atlántica) . . . . . *cancer*

CLAVE PARA ESPECIES DEL GENERO *HAEMAGOGUS***

1. Usualmente 5-12 (4-20) dientes del peine en sola fila; cerda 4-X con 5 pares (raramente 6) de cerdas 2
Usualmente 10-50 (6-75) dientes del peine en fila doble o formando un parche triangular; cerda 4-X con 6 pares de cerdas . 4

2(1). Integumento corporal con espiculas . . . . . *mesodentatus*
Integumento corporal sin espiculas 3

3(2). Cerda 12-I ausente; índice sifonal 2.0 . . . . . *anastasionis*
Cerda 12-I presente; índice sifonal 2.5-3.0 . . . . . *equinus*

4(1). Espinas del márgen caudal de silla de montar reducidas, muy cortas, cada una con muchos dientes; pécten extendiéndose basalmente hasta 0.45 del sifón . . . . . *aeritinctus*
Espinas del márgen caudal de silla de montar gruesas, varias espinas largas y con un solo diente; pécten extendiéndose basalmente hasta 0.5 del sifón . . . . . *regalis*

*Clave adaptada de Adames (1971).
**Clave adaptada de Arnell (1973).

CLAVE PARA ESPECIES DEL GENERO *LIMATUS**

Cerda 4-X con 3,4 pares de cerdas . . . . . *durhamii*
Cerda 4-X con 7,8 pares de cerdas . . . . . *asulleptus*

CLAVE PARA ESPECIES DEL GENERO *MANSONIA***

Cerda 4-X con 4 pares de cerdas adheridas a red . . . . *titillans*
Cerda 4-X con 3 pares de cerdas en red . . . . . *dyari*

CLAVE PARA ESPECIES DEL GENERO *PSOROPHORA****

1. Cabeza cuadrada; cepillos palatinos laterales con ganchos gruesos (subgénero *Psorophora*) 2
   Cabeza ovalada; cepillos palatinos laterales compuestos de muchos filamentos delgados 5

2(1). Indice sifonal 5.0 o mas; cerda 1-S multiramificada . . . *lineata*
   Indice sifonal 4.0 o menos; cerda 1-S sin ramificaciones 3

3(2). Cerda 1-X con 3,4 ramificaciones que parten de cerca de la base . . . . . *ciliata*
   Cerda 1-X sin ramificaciones o está bifurcada a partir de la mitad 4

4(3). Indice sifonal 4.0; pécten extendiéndose hasta la mitad del sifón . . . . . *howardii*
   Indice sifonal 2.0 o menos; pecten extendiéndose casi hasta el ápice del sifón . . . . . *cilipes*

5(1). Antenas mas cortas que la longitud de la cabeza (subgénero *Grabhamia*) . . . . . *confinnis*
   Antenas tan o mas largas que la longitud de la cabeza (subgénero *Janthinosoma*) 6

6(5). Antena tan o raremente un poco mas larga que la longitud de la región media de la cabeza . . . . . *varipes*
   Antenas definitivamente mas largas que longitud de región media de la cabeza 7

7(6). Cerda 1-X sin ramificaciones . . . . . *lutzii*
   Cerda 1-X con 3 o mas ramificaciones . . . . . *ferox*

*Clave adaptada de Lane (1953).
**Clave adaptada de Belkin et al. (1970).
***Larvas de *Ps. albipes* y *Ps. champerico* se desconocen.

CLAVE PARA ESPECIES DEL
GENERO *RUNCHOMYIA**

La mayoría de los dientes del peine adheridos a placa esclerotizada; cerda 5-T muy desarrollada . . . . . *magna*
Dientes del peine no parten de placa esclerotizada; cerda 5-T poco desarrollada . . . . . *espini*

CLAVE PARA ESPECIES DEL
GENERO *SABETHES***

Indice sifonal 4.0-5.0; cerda 1-X sin ramificaciones . . . *cyaneus*
Indice sifonal 3.0; cerda 1-X doble . . . . . *chloropterus*

CLAVE PARA ESPECIES DEL
GENERO *TOXORHYNCHITES****

Indice sifonal 3.5-4.0 . . . . . *haemorrhoidalis superbus*
Indice sifonal 1.5-2.0 . . . . . *theobaldi*

CLAVE PARA ESPECIES DEL
GENERO *URANOTAENIA*****

1. Cerda 6-I,II doble 2
   Cerda 6-I,II triple 3

2(1). Cerda 14-P multiramificada . . . . . *coatzacoalcos*
   Cerda 14-P sin ramificaciones . . . . . *lowii*

3(1). Cerda 14-P sin ramificaciones . . . . . *geometrica*
   Cerda 14-P con 3 o mas ramificaciones 4

4(3). Cerda 4-C doble, raramente triple; cerda 7-C con 4,5 ramificaciones; cerda 14-P con 6,7 ramificaciones . . . . . *socialis*
   Cerda 4-C con 4,5 ramificaciones; cerda 7-C con 7,8 ramificaciones; cerda 14-P con 3-6 ramificaciones . . . . *pulcherrima*

CLAVE PARA ESPECIES DEL
GENERO *WYEOMYIA******

1. Sifón cubierto con espinas pequeñas que parecen espinas del pécten 2
   Sifón sin espinas pequeñas 3

*Clave adaptada de Zavortink (1979a).
**Clave adaptada de Lane (1953). Larva de *Sa. tarsopus* desconocida.
***Clave adaptada de Lane (1953). Larva de *Tx. grandiosus* desconocida.
****Clave adaptada de Galindo et al. (1954). Larva de *Ur. orthodoxa* desconocida.
*****Clave adaptada de Lane (1953).

2(1). Indice sifonal 3.0 o menos . . . . . *pseudopecten*
Indice sifonal mayor que 3.0 . . . . . *chalcocephala*

3(1). Dientes del peine del segmento VIII unidos a placa esclerotizada . . . . . *arthrostigma*
Dientes del peine no unidos a placa esclerotizada 4

4(3). Indice sifonal mayor que 5.0 5
Indice sifonal menor que 5.0 7

5(4). Sifón con 2 pares de cerdas con 3 ramificaciones cerca de la base . . . . . *celaenocephala*
Sifón sin 2 pares de cerdas con 3 ramificaciones cerca de la base 6

6(5). Cerdas 5,6-C grandes, sobrepasando el márgen anterior de la cabeza . . . . . *abebela*
Cerdas 5,6-C pequeñas, no alcanzando el márgen anterior de la cabeza . . . . . *melanopus*

7(4). Cerdas 2,3-X simples . . . . . *guatemala*
Cerdas 2,3-X por lo menos bifurcadas 8

8(7). Ramificaciones de cerda 4-X tan o mas largas que longitud del segmento X . . . . . *hemisagnosta*
Ramificaciones de cerda 4-X mas cortas que segmento X. . *aporonoma*

DATA ON THE DISTRIBUTION AND BIONOMICS OF THE MOSQUITOES OF GUATEMALA

This section deals with the distribution and bionomics of the mosquito fauna of Guatemala. Every effort has been exerted to accumulate all known records on the distribution of Guatemalan mosquitoes, and they have been listed under appropriate species. The distribution data are based upon collections made by the authors, by other staff members of the Medical Entomology Research and Training Unit, Universidad del Valle de Guatemala, records from the literature, and information from the Servicio Nacional de Erradicación de Malaria, Guatemala.

The data listed under each species are as follows: Department of Guatemala in capital letters, locality, date, specimens collected, i.e. F- adult female, M- adult male, L- larva, RA- associated rearing, I- incomplete associated rearing. The final initials are those of the collectors. The ones mentioned are as follows: CEA- Carlos Estuardo Aguilar, SCG- Stephanie Clark-Gil, EWC- Eddie W. Cupp, RFD- Richard F. Darsie, MD- Michael William Dix, CMG- C. Michael Gruner, OHD- Oswaldo Hernández-Duque, JHH- Jesse H. Hobbs, PAM- Pedro A. Molina, CHP- Charles H. Porter.

Records cited from the literature mention only the department and locality. Other details may be obtained by consulting the reference.

For 16 species, systematic notes were written to discuss their taxonomic status. In most cases, it was necessary to clarify exactly which taxon, or complex of taxa, was being discussed.

The details given under bionomics review the habits and behavior of the immature and adult stages, where known. Observations made during the project are listed first followed by those in the literature. From the latter source, we have given data from Guatemala and only used examples from other countries where necessary to offer an idea of their activities in nature.

Two of the 124 species have not been included in this section. They are *Cx. ousqua* and *Cx. usquatus*. They have both been reported from Guatemala by Bram (1967) and Knight & Stone (1977). They belong to the *Cx. coronator* complex and are distinguished by the male genitalia. Neither their specific distribution in Guatemala nor particulars of their bionomics are known.

To aid in finding the localities mentioned in the distribution of species, see the map, Figure 10.

Figure 10. Map of Guatemala, showing the boundaries of the 22 Departments.

1. *Aedeomyia (Aedeomyia) squamipennis* (Lynch-Arribalzaga)

Distribution: ESCUINTLA, Escuintla, Fca. San Bernardo, VII-3-80, 11F, 4M, 16L, PAM. Reported from IZABAL, Morales by Heinemann & Belkin (1977a).

Bionomics: This species was found breeding in a pond covered with *Salvinia* sp. Heinemann & Belkin (1977a) recorded it from a similar habitat with floating *Pistia* sp. It has been found associated with *An. albimanus*, *Cx. erraticus* and *Ma. dyari*.

2. *Aedes (Aedimorphus) vexans* (Meigen)

Distribution: Reported from ESCUINTLA, Palín and GUATEMALA, Guatemala City by Heinemann & Belkin (1977a).

Bionomics: Heinemann & Belkin (1977a) reported it breeding in grassy pools, in association with several species of the genus *Culex*, also with *Ae. angustivittatus* and *An. hectoris*.

3. *Aedes (Howardina) allotecnon* Kumm, Komp & Ruiz

FIRST REPORT IN GUATEMALA

Distribution: BAJA VERAPAZ, Santa Barbara, VIII/22/79, 2F, CHP. QUICHE, Km. 139 road to Chichicastenango, VII/19/80, 10F, SCG, CEA. SOLOLA, Aldea Panimaquib, VII-VIII/79, 3F, CHP. SUCHITEPEQUEZ, Fca. Sta. Isabel, VI/79, 1F, CHP. Berlin (1969a) noted that this species is "possibly in eastern Guatemala"; and although Lane (1953) reported it from Guatemala, no locality was specified, so we believe that we have the first extant specimens.

Bionomics: The species was breeding in epiphytic bromeliads growing on shade trees of a coffee plantation. Adults were collected at noon in a forest coming to humans. Berlin (1969a) found it breeding in association with members of the *Ae. quadrivittatus* group.

4. *Aedes (Howardina) guatemala* Berlin

Distribution: SOLOLA, Aldea Panimaquib, V-X/79, 15F, 5M, CHP. SUCHITEPEQUEZ, El Vesuvio, VI/80, 7F; Fca. Sta. Isabel, VI, VII, VIII/79, 12F, CHP. It was reported from CHIMALTENANGO, Yepocapa (HOLOTYPE) by Berlin (1969a).

Bionomics: The species was found breeding in epiphytic bromeliads. Adults coming to humans were collected among coffee plants and in the housing area of a plantation during the day. Heinemann & Belkin (1977a) reported larvae in tree holes.

5. *Aedes (Howardina) guerrero* Berlin

FIRST REPORT IN GUATEMALA

Distribution: BAJA VERAPAZ, Santa Barbara, VI/25/80, 2F, 2RA, MD.

Bionomics: This species was breeding in epiphytic bromeliads of the genus *Tillandsia* in association with *Ae. quadrivittatus*, *Cx. declarator*, *Cx. erethyzonfer*, *Cx. restrictor*, and *Wy. celaenocephala*. Berlin (1969a) recorded adults attracted to humans in a pine-oak forest during the day.

6. *Aedes (Howardina) quadrivittatus* (Coquillett)

Distribution: BAJA VERAPAZ, Santa Barbara. VI/25/80, 2F, 3L, 2RA, MD; Purulhá, VII/5/80, 1F, SCG. CHIMALTENANGO, Pochuta, Fca. Sta. Emilia, VI/25/80, 1F, SCG. SOLOLA, Aldea Panimaquib, V-X/79, 24F, CHP. SUCHITEPEQUEZ, Fca. Los Tarrales, V-XII/79, 5F, CHP; Fca. Sta. Isabel, III-XI/79, 21F, CHP. Howard et al. (1917) reported the HOLOTYPE from HUEHUETENANGO, Chácula. It was reported in SOLOLA, San Andrés Semetabaj and Sololá by Heinemann & Belkin (1977a).

Bionomics: This species was breeding in epiphytic bromeliads in association with *Ae. guerrero*, *Cx. declarator*, *Cx. erethyzonfer*, and *Wy. celaenocephala*. Adults were collected from a tropical forest during the afternoon coming to humans. Berlin (1969a) reported that females are strongly attracted to humans.

7. *Aedes (Ochlerotatus) angustivittatus* Dyar & Knab

Distribution: SANTA ROSA, La Avellana, VIII/5/80, 1F; VIII/24-25/80, 2F; VIII/80, 9F, EWC. SOLOLA, Aldea Panimaquib, VII/79, 2F, CHP. Heinemann & Belkin (1977a) reported it from ESCUINTLA, San José, Iztapa, Sta. Lucia Cotzumalguapa; GUATEMALA, Guatemala City; IZABAL, Morales. Howard et al. (1915) reported it from ALTA VERAPAZ, Cacao.

Bionomics: Females attracted to humans were collected from coffee plantations, forest areas and near marshes during the day. Adults were captured with a net near a river bank. Heinemann & Belkin (1977a) recorded this species breeding in temporary ground pools located in grassy areas. They were associated with *Ae. scapularis*, *Ae. serratus*, *Ae. taeniorhynchus*, *Cq. nigricans*, *Hg. equinus*, *Ma. dyari*, *Ps. albipes*, and *Ps. ferox*.

8. *Aedes (Ochlerotatus) epactius* Dyar & Knab

Distribution: CHIQUIMULA, El Amatillo, VIII/11/80, 2F, 1M, 4L, 1RA, CEA. GUATEMALA, Guatemala City, Zone 15, VI-VIII/80, 4F, 2M, 8L, CMG. Zavortink (1972) recorded it from GUATEMALA, Guatemala City.

Bionomics: The species breeds in artificial containers, such as tires, barrels and cans, associated with several species of the genus *Culex* and *Ur. coatzacoalcos*. Zavortink (1972) reported it breeding in rock holes, ground pools, and tree holes. Adults are attracted to light, and females are active biters.

9. *Aedes (Ochlerotatus) euplocamus* Dyar & Knab

FIRST REPORT IN GUATEMALA

Distribution: JUTIAPA, Km. 87.5, VIII/10/80, 1F, 1RA, CEA. SANTA ROSA, La Avellana, VIII/80, 1F, EWC.

Bionomics: This species was taken from a temporary ground pool in association with several species of the genus *Culex*. Females attracted to humans were collected in a forest.

10. *Aedes (Ochlerotatus) fulvus* (Wiedemann)

Distribution: PETEN, Tikal, VI/30/80, 5F; Tikal surroundings, VI/30/80, 1F, CHP. Howard et al. (1917) reported this species from ALTA VERAPAZ, Cacao. Heinemann & Belkin (1977a) recorded it from IZABAL, Morales.

Bionomics: Adults were attracted to light traps situated in forest areas. Heinemann & Belkin (1977a) noted females alighting on humans. Carpenter & La Casse (1955) dipped immature stages from ground pools formed after heavy rains.

11. *Aedes (Ochlerotatus) hastatus* Dyar

FIRST REPORT IN GUATEMALA

Distribution: PETEN, Tikal, VII/6/80, 1F; San Benito, VII/2/80, 1F, CHP.

Bionomics: The females were collected in light traps in forest areas in Peten. Little is known of the ecology of this species.

12. *Aedes (Ochlerotatus) scapularis* (Rondani)

Distribution: SANTA ROSA, La Avellana, VIII/80, 3F, EWC. SOLOLA, Aldea Panimaquib, VII/79, 2F, CHP. Arnell (1976) reported it from ESCUINTLA, El Carrizo, Iztapa; IZABAL, Bananera, Mojaca, Navajo; PETEN, La Libertad, San Juan Acul. Heinemann & Belkin (1977a) recorded it from ESCUINTLA, Iztapa; IZABAL, Morales, El Cedro.

Bionomics: Females coming to humans were taken in forest areas and coffee plantings during dawn and dusk. Heinemann & Belkin (1977a) found the species breeding in temporary ground pools with abundant vegetation. Arnell (1976) collected it from crab holes, rock holes, and marsh banks. Davis & Shannon (1929) demonstrated that *scapularis* is an efficient vector of yellow fever under experimental conditions. Causey et al. (1961) reported Venezuelan equine encephalitis (VEE) virus being isolated from females of *scapularis* from the Amazon region in Brazil.

13. *Aedes (Ochlerotatus) serratus* (Theobald)

Systematic Note: Heinemann & Belkin (1977a) indicated that the species identified as *Ae. serratus* (Theobald) constitutes a species complex. Since the group needs further study and the members of the complex cannot be separated with certainty, the specimens identified as *serratus* in this study may represent more than ones species.

Distribution: PETEN, Tikal, VII/6/80, 5F; surroundings of Tikal, IX/3/80, 1F: 3 km from Sn. Benito, VII/2/80, 5F; 5 km from Las Cruces, VII/3/80, 4F; Fca. El Zapote, IX/8/80, 2F, CHP. Heinemann & Belkin (1977a) reported it from IZABAL, Morales; SUCHITEPEQUEZ, Patulul.

Bionomics: All the specimens were obtained from light traps situated in the forest. Howard et al. (1917) found this species breeding in temporary ground pools. Heinemann & Belkin (1977a) reported females attracted to humans in marshy areas and bamboo plantings.

14. *Aedes (Ochlerotatus) taeniorhynchus* (Wiedemann)

Distribution: SANTA ROSA, La Avellana, VII/80, 1F; VIII/80, 9F, EWC. Heinemann & Belkin (1977a) and Howard et al. (1915) reported it from ESCUINTLA, San José, Iztapa; IZABAL, Morales, Puerto Barrios; RETALHULEU, Champerico.

Bionomics: Females coming to humans were taken in swampy-forest areas near the coast during the afternoon. Carpenter & La Casse (1955) found this species breeding in marshy areas near the coast. Belkin et al. (1970) collected it breeding with *De. cancer*. Females are active diurnal biters especially in swampy-forest areas. VEE virus was isolated from this species in Guatemala (Sudia & Newhouse, 1975).

15. *Aedes (Ochlerotatus) tormentor* Dyar & Knab

Distribution: PETEN, Fca. El Zapote, IX/8/80, 1F, CHP. It was reported from Guatemala, no locality specified, by Knight & Stone (1977).

Bionomics: The single female was collected by a light trap in a forest area. Carpenter & La Casse (1955) reported that it breeds in temporary ground pools formed after heavy rains. Very little is known about the habits of adults.

16. *Aedes (Protomacleaya) daryi* Schick

Distribution: CHIMALTENANGO, Pochuta, Fca. Pacayal, VI/26/80, 1L, SCG. Schick (1970) reported the HOLOTYPE from ALTA VERAPAZ, Senahú, Fca. Trece Aguas.

Bionomics: The species breeds in cut bamboo internodes filled with water in association with *Ae. homoeopus*, *Ae. insolitus*, *Cx. bihaicola*, *Cx. metempsytus*, and *Cx. thriambus*.

17. *Aedes (Protomacleaya) homoeopus* Dyar

Distribution: CHIMALTENANGO, Pochuta, Fca. Sta. Emilia, Fca. Pacayal, VI/25-26/80, 18F, 2L, 5RA, SCG. SANTA ROSA, La Avellana, VIII/80, 1F, EWC. SOLOLA, Aldea Panimaquib, VIII/79, 1F, CHP. SUCHITEPEQUEZ, Fca. Santa Isabel, VIII/79, 5F, CHP. Schick (1970) and Heinemann & Belkin (1977a) reported it from CHIMALTENANGO, Yepocapa, Rio Queleya, and Fca. Sta. Isabel; GUATEMALA, Amatitlán; Guatemala City, Zone 10, Villa de Guadalupe.

Bionomics: The species was taken from cut or broken bamboo internodes containing water, in association with *Ae. daryi*, *Ae. insolitus*, *Cx. bihaicola*, *Cx. metempsytus*, and *Cx. thriambus*. Females attracted to humans were collected in tropical forest areas during dusk. Heinemann & Belkin (1977a) noted it breeding in tree holes and artificial containers (flower pots in cemetery).

18. *Aedes (Protomacleaya) impostor* Schick

Distribution: Schick (1970) reported it from ALTA VERAPAZ, Senahú, Fca. Trece Aguas (HOLOTYPE).

Bionomics: Heinemann & Belkin (1977a) reported this species breeding in bamboo internodes filled with water, in association with *Ae. daryi*, *Cx. bihaicola*, *Tr. digitatum*, and *Wy. aporonoma*. Schick (1970) reported finding the HOLOTYPE in a bamboo internode at 950 meters above sea level.

19. *Aedes (Protomacleaya) insolitus* (Coquillett)

Distribution: CHIMALTENANGO, Pochuta, Fca. Pacayal, VI/26/80, 1F, 1RA, SCG. Heinemann & Belkin (1977a) reported it from CHIMALTENANGO, Yepocapa and RETALHULEU, San Felipe. Schick (1970) erroneously reported San Felipe as being in the Department of Suchitepéquez.

Bionomics: This species was found breeding in a bamboo internode filled with water, in association with *Ae. daryi*, *Ae. homoeopus*, *Cx. bihaicola*, *Cx. metempsytus*, and *Cx. thriambus*. Schick (1970) reported the adults to be anthopophilic. Heinemann & Belkin (1977a) observed the species breeding in tree holes and bamboo internodes, in association with *Ae. homoeopus*, *Cx. restrictor*, and *Hg. mesodentatus*.

20. *Aedes (Protomacleaya) podographicus* Dyar & Knab

Distribution: SANTA ROSA, La Avellana, VII/4-5/80, 1F; VIII/25-26/80, 1F; VIII/5/80, 3F, EWC. Schick (1970) reported it from ESCUINTLA, San José, Escuintla. Heinemann & Belkin (1977a) recorded it from RETALHULEU, San Sebastián.

Bionomics: The females collected were alighting on humans in forest areas during dusk. Heinemann & Belkin (1977a) report finding this species breeding in bamboo internodes filled with water and in tree holes. *Aedes podographicus* was found associated with *Ae. sandrae*, *Cx. restrictor*, *Hg. mesodentatus*, and *Wy. arthrostigma*.

21. *Aedes (Protomacleaya) sandrae* Zavortink

Distribution: Zavortink (1972) reported finding it in ESCUINTLA, Escuintla, GUATEMALA, Guatemala City (HOLOTYPE) and SOLOLA, San Andrés Semetabaj.

Bionomics: Zavortink (1972) reported collecting the HOLOTYPE from a bamboo internode filled with water; it was also taken from tree holes; *Ae. sandrae* was associated with *Ae. podographicus*, *Cx. pinarocampa*, *Cx. restrictor*, and *Tx. theobaldi*.

22. *Aedes (Stegomyia) aegypti* (Linnaeus)

Distribution: *Ae. aegypti* has a cosmopolitan distribution (Christophers, 1960). Howard et al. (1915) reported finding it in ESCUINTLA, San José; IZABAL, Livingston; RETALHULEU, Champerico. It is reported to be widely distributed in Guatemala at the lower elevations (Molina, P.A., 1980, in litt.).

Bionomics: Christophers (1960) reported the breeding sites of *Ae. aegypti* include a variety of artificial containers, such as pots, vases, cups, cans, barrels, broken bottles, fountains, and tires. Although it is known as the "yellow fever mosquito", the vector of the urban type, it is also the principal vector of dengue fever. It has been confirmed that *Ae. aegypti* is a vector of *Dirofilaria* in dogs (Christophers, 1960).

23. *Anopheles (Anopheles) apicimacula* Dyar & Knab

Distribution: JALAPA, Km. 165 road to Jalapa, VIII/10/80, 2L, CEA. Howard et al. (1917) found the HOLOTYPE in IZABAL, Livingston. For additional information on distribution, see Table 3.

Bionomics: The species was breeding in a ground pool with herbaceous vegetation. Howard et al. (1917) and Belkin et al. (1965) reported it in ground pools near river banks in association with *Cx. derivator*. Vargas & Martínez-Palacios (1956) stated that females are seldom found inside houses.

24. *Anopheles (Anopheles) crucians* Wiedemann

Distribution: PETEN, 5 km from Las Cruces, VII/3/80, 6F, CHP. Brennan (1951) found it in GUATEMALA, Amatitlán. For additional information on distribution, see Table 3.

Bionomics: Females were collected in a CDC miniature light trap placed in a forest at 120 meters above sea level. Brennan (1951) found *An. crucians* breeding in a semi-permanent swamp at about 1067 meters above sea level. Vargas & Martínez-Palacios (1956) have taken *An. crucians* naturally infected with human plasmodia, but this species is seldom captured inside houses.

25. *Anopheles (Anopheles) eiseni* Coquillett

Distribution: Howard et al. (1917) and Belkin et al. (1965) reported the HOLOTYPE from ESCUINTLA, Sta. Lucía Cotzumalguapa. For additional information on distribution, see Table 3.

Bionomics: Howard et al. (1915) and Belkin et al. (1965) reported this species breeding in treeholes, bamboo internodes containing water, and fallen leaves. They have been observed breeding in ground pools near river banks. The females are suspected of being anthropophilic.

Table 3. Record of Anopheline Distribution in Guatemala*

Department	*An. albimanus*	*An. apicimacula*	*An. argyritarsis*	*An. crucians*	*An. darlingi*	*An. eiseni*	*An. gabaldoni*	*An. hectoris*	*An. neivai*	*An. parapunctipennis var. guatemalensis*	*An. pseudopunctipennis*	*An. punctimacula*	*An. strodei*	*An. vestitipennis*	*An. xelajuensis*	*Ch. bathana*
Alta Verapáz	★	★	★	★		★		★			★	★		★		
Baja Verapáz	★	★	★			★		★			★	★				
Chimaltenango	★		★					★			★					
Chiquimula	★	★	★			★		★			★	★				
El Progreso	★		★			★		★			★					
Escuintla	★	★	★	★		★					★	★		★		
Guatemala	★		★					★			★					
Huehuetenango	★	★	★			★		★			★	★		★		
Izabal	★	★	★	★	★	★		★	★		★	★		★		★
Jalapa	★	★	★					★			★					
Jutiapa	★		★								★			★		
Petén	★	★	★	★	★	★	★	★	★		★	★	★	★		★
Quetzaltenango	★	★				★		★		★	★				★	
Quiché	★	★	★			★		★			★	★		★		
Retalhuleu	★		★			★		★			★	★				
Sacatepéquez	★		★								★					
San Marcos	★	★						★			★	★				
Santa Rosa	★	★	★			★					★	★		★		
Sololá	★	★	★					★			★					
Suchitepéquez	★	★				★					★	★				
Totonicapán	★							★		★						
Zacapa	★		★								★	★		★		

*Data mostly from Servicio Nacional de Erradicación de Malaria, Ministerio de Salud Pública, Guatemala. No locality was specified for *An. allopha* and *An. intermedius*.

26. *Anopheles (Anopheles) gabaldoni* Vargas

Distribution: Lane (1953) reported it from PETEN, no locality specified.
Bionomics: Vargas & Martínez-Palacios (1956) stated that the immature stages prefer shady breeding sites containing plant debris. The females are anthropophilic and are frequently captured inside houses.

27. *Anopheles (Anopheles) hectoris* Giaquinto-Mira

Distribution: GUATEMALA, Bárcenas, VIII/24/80, 1F, CEA. QUETZALTENANGO, Cantel, Km. 220, VII/20/80, 2F, 1M, 1L, 1RA; Salcajá, VII/20/80, 7F, 2M, 8RA; Zunil, VII/21/80, 1M, 1L, 1RA, CEA. QUICHE, Los Encuentros, Km. 102, VII/19/80, 1F, 3L, 1RA, CEA. TOTONICAPAN, Totonicapán, VII/20/80, 2F, 1M; 1 km. from Cuatro Caminos, VII/20/80, 1M, CEA. Heinemann & Belkin (1977a) reported it from CHIMALTENANGO, Acatenango; GUATEMALA, Guatemala City, Zone 5, El Milagro, Campo Marte; SOLOLA, Godinez. For additional informaton on distribution, see Table 3.
Bionomics: The species was collected in a variety of habitats including ground pools with clear and contaminated water, irrigation channels, and rivulets with abundant vegetation. All sites contained algae (*Spirogyra*) in their waters. *Anopheles hectoris* was associated with *An. albimanus*, *Cs. particeps*, *Cx. coronator*, and *Cx. peus*. Heinemann & Belkin (1977a) and Belkin et al. (1965) reported that its larvae are found in clear ground pools with aquatic vegetation in association with *Ae. angustivittatus*, *Ae. vexans*, *Cs. particeps*, *Cx. coronator*, *Cx. derivator*, *Cx. iolambdis*, *Cx. peus*, *Cx. pilosus*, *Cx. pinarocampa*, and *Cx. thriambus*. It is a suspected vector of malaria in Guatemala according to May (1961), although Vargas & Martínez-Palacios (1956) reported that the species is seldom found inside houses.

28. *Anopheles (Anopheles) intermedius* (Peryassu)

Distribution: Lane (1953) reported it from GUATEMALA, no locality or ecological data specified.
Bionomics: Belkin et al. (1971) reported larvae breeding in ground pools surrounded by dense vegetation and in ponds in forest areas.

29. *Anopheles (Anopheles) parapunctipennis* var. *guatemalensis* De León

Distribution: QUETZALTENANGO, Palestina, VII/22/80, 2L, CEA. De León (1938) found the HOLOTYPE in TOTONICAPAN, Cumbre del Aire.

Bionomics: Larvae were dipped from a clear-water ground pool at the roadside, in association with *Cs. particeps* and *Cx. derivator*. De León (1938) and Belkin et al. (1965) reported larvae occurring in cold water ponds.

30. *Anopheles (Anopheles) pseudopunctipennis* Theobald

Distribution: CHIQUIMULA, Km. 205, VIII/12/80, 3L, CEA. JALAPA, San Antonio Monjas, VIII/11/80, 3F, 3M, 3L: Km. 167, VIII/11/80, 1F, 2M, CEA. JUTIAPA, El Porvenir, Km. 126, VII/10/80, 2L; Km. 107 1/2 La Pava VIII/10/80; Km. 98, El Zarzalito, VIII/10/80, 2F, 2L, 4RA, 3I, CEA. Heinemann & Belkin (1977a) reported it from GUATEMALA, Guatemala City; ESCUINTLA, Santa Lucía Cotzumalguapa. For additional information on distribution, see Table 3.

Bionomics: Larvae were collected from clear ground pools containing plants belonging to Gramineae and aquatic vegetation, in association with *An. albimanus*, *An. argyritarsis*, *Cx. chidesteri*, *Cx. coronator*, *Cx. interrogator*, *Cx. trifidus*, and *Ur. geometrica*. Heinemann & Belkin (1977a) recorded larvae in a similar habitat in association with *An. hectoris*. It is a well known vector of malaria in Mexico (Vargas & Martínez-Palacios, 1956) and believed to transmit this disease in the highlands of Guatemala City (May, 1961).

31. *Anopheles (Anopheles) punctimacula* Dyar & Knab

Distribution: PETEN, Fca. El Zapote, IX/8/80, 1F, CHP. Heinemann & Belkin (1977a) reported it in IZABAL, Ruinas de Quiriguá. For additional information on distribution, see Table 3.

Bionomics: The female collected was attracted to a CDC miniature light trap placed in the forest. Heinemann & Belkin (1977a) recorded larvae in a large temporary ground pool in a shaded forest area, in association with *Cx. conspirator*. Vargas & Martínez-Palacios (1956) seldom recorded the species inside houses.

32. *Anopheles (Anopheles) vestitipennis* Dyar & Knab

Distribution: IZABAL, Km. 264 1/2, Satélite, Fca. El Milagro, X/23/80, 1F, JHH. Howard et al. (1917) reported it from ALTA VERAPAZ, Rio Polochic, Cacao, Fca. Trece Aguas (HOLOTYPE), Panzós. For additional information on distribution, see Table 3.

Bionomics: The females were captured with an aspirator while resting on a stable wall. Carley (1931) reported that *An. vestitipennis* is suspected to be a malaria vector in Cuba and Belize. Belkin et al. (1965) reported larvae in shaded bodies of water like rivulets, ponds and ground pools and also in ditches with abundant vegetation. Vargas & Martínez-Palacios (1956) disclosed that females are often taken inside houses and will readily feed on humans.

33. *Anopheles (Anopheles) xelajuensis* De León

Distribution: De León (1938) reported the HOLOTYPE in QUETZALTENANGO, Cerro Quemado.

Bionomics: Larvae have been collected in a tree hole at 2500 meters above sea level (Zavortink, 1970). The HOLOTYPE male was found while resting on rocks in an oak forest in the Altiplano.

34. *Anopheles (Kerteszia) neivai* Dyar & Knab

Distribution: BAJA VERAPAZ, Purulhá, VII/5/80, 1F, SCG. Zavortink (1973) reported it in GUATEMALA, Guatemala City. For additional information on distribution, see Table 3.

Bionomics: The only female collected was attracted to humans the afternoon in a dense rain forest. Zavortink (1973) reported that this species breeds in water in epiphytic and terrestrial bromeliads. The females are anthropophilic and are actively biting at dusk. *Anopheles neivai* is the principal vector of malaria in the south coastal area of Buenaventura, Colombia, has been detected naturally infected with yellow fever in Panama and Guaroa virus in Colombia, and was included in the group of mosquitoes infected with VEE, Ilheus, and Guaroa viruses in Panama (Rodaniche et al., 1957; Galindo et al., 1966; Lee & Sanmartin, 1967).

35. *Anopheles (Nyssorhynchus) albimanus* Weidemann

Distribution: SANTA ROSA, La Avellana, VIII/80, 19F, 11M, 3L, 2RA, RFD, SCG, CEA, EWC. TOTONICAPAN, Totonicapán, VII/20/80, 1L, CEA. Castañaza (1980, pers. com.) indicated that *An. albimanus* is widely distributed in all the departments of the Republic of Guatemala. Howard et al. (1917) and Heinemann & Belkin (1977a) reported it from ESCUINTLA, Puerto San José; GUATEMALA, Amatitlán; IZABAL, Puerto Barrios, Quiriguá, Morales; PETEN, Pueblo Nuevo, Laguna San Juan Acul; RETALHULEU, Champerico; ZACAPA, Km. 123, Ruta al Atlántico. For additional information on distribution, see Table 3.

Bionomics: Immature stages were collected from a pond with dense aquatic vegetation, a ground pool with contaminated water, and in flood water deposited in a grassy area. It was associated with *Cx. erraticus* and *An. hectoris*. Adults were collected coming to humans in forest and housing areas during dusk and also using a CDC miniature light trap placed in the forest. *An. albimanus* is the principal malaria vector in Guatemala (May, 1961; SNEM, 1978). For extensive data on its ecology, consult Komp (1942), Vargas & Martínez-Palacios (1956), Carpenter & La Casse (1955), Carley (1931), Heinemann & Belkin (1977a), and the publications cited by Breeland (1980).

36. *Anopheles (Nyssorhynchus) allopha* (Peryassu)

Systematic Note: This species was resurrected from synonymy with *An. albitarsis* Lynch-Arribalzaga by Faran & Linthicum (1981). The true *albitarsis* is confined to southern South America, while *allopha* extends from Brazil and Paraguay north to Guatemala.

Distribution: Knight and Stone (1977) and Faran & Linthicum (1981) listed it from Guatemala, no locality specified.

Bionomics: The larvae have been taken from large and small ground pools, stream pools and marshes with abundant vegetation and usually in full sun (Faran & Linthicum, 1981).

37. *Anopheles (Nyssorhynchus) argyritarsis* Robineau-Desvoidy

Distribution: JALAPA, Km. 156, San Antonio Monjas, VIII/10/80, 2RA, CEA. JUTIAPA, Km. 92 road to Jutiapa, VIII/10/80, 1F, 2L, 1RA; Km. 98, El Zarzalito, VIII/10/80, 1F, 1RA, CEA. Komp (1942) and Knight & Stone (1977) reported it from GUATEMALA, no locality specified. For additional information on distribution, see Table 3.

Bionomics: The immature stages were collected from several ground pools which contained abundant *Spirogyra* and from a pond surrounded by plants of Gramineae associated with *An. pseudopunctipennis*, *Cx. coronator*, and *Cx. trifidus*. Komp (1942) reported the species breeding in hoof prints. Stone (1969) stated the adults usually feed on domestic animals but will bite man if he is near.

38. *Anopheles (Nyssorhynchus) darlingi* Root

Distribution: IZABAL, Km. 264 1/2, Satélite, Fca. El Milagro, X/23/80, 3F, JHH. Komp (1942) reported it from GUATEMALA, no locality specified. For additional information on distribution, see Table 3.

Bionomics: The females were captured by means of an aspirator when they were resting on a stable wall. Komp (1942) stated that *An. darlingi* breeds in ditches, ground pools near river banks and ponds; usually the breeding sites are under partial shade. Apparently, it prefers large bodies of water but has been found breeding in hoof prints as well. It is an important vector of malaria in South America (Lane, 1953), but whether or not it plays a similar role in Guatemala has yet to be proven. Vargas & Martínez-Palacios (1956) reported that females, positive for human blood, are found frequently inside houses.

39. *Anopheles (Nyssorhynchus) strodei* Root

Systematic Note: Knight & Stone (1977) accepted *An. strodei* Root as a synonym of *An. evansi* (Brethes). Faran (1980) did not agree with this, and in his work he cited substantial evidence to show that *strodei* is a different species from *evansi*.

Distribution: Kumm et al. (1943) captured it from PETEN, Santa Teresa.

Bionomics: Kumm et al. (1943) reported adults in housing areas but outside the houses. Faran (1980) mentioned that the immature stages of *strodei* are usually found in ground pools but have been collected from other habitats. Generally, they are associated with abundant vegetation like algae and Gramineae. They have shared their breeding sites with members of the genera *Culex* and *Uranotaenia*.

40. *Chagasia bathana* (Dyar)

Distribution: Knight & Stone (1977) and Lane (1953) reported it from GUATEMALA, no locality specified. For additional information on distribution, see Table 3.

Bionomics: Komp (1942) reported larvae in heavily shaded rivulets or ground pools. Some have been found in ground pools near river banks. Vargas & Martínez-Palacios (1956) indicated that females do not visit houses.

41. *Coquillettidia (Rhynchotaenia) nigricans* (Coquillett)

Distribution: Heinemann & Belkin (1977a) reported it in IZABAL, Morales.

Bionomics: Heinemann & Belkin (1977a) noted that adults were attracted to humans in a secondary forest, a swampy area, and a bamboo planting during the afternoon. Dyar (1925) stated that the larvae are found attached to the roots of aquatic plants.

42. *Coquillettidia (Rhynchotaenia) venezuelensis* (Theobald)

Distribution: PETEN, Tikal, VII/1/80, 1F; Tikal surroundings, IX/3/80, 5F; 5 km from Las Cruces, VII/3/80, 6F, CHP. SANTA ROSA, La Avellana, VIII/24-25/80, 8F; VIII-25-26/80, 1F, EWC. Howard et al. (1915) collected it in ALTA VERAPAZ, Trece Aguas and Rio Polochic.

Bionomics: The specimens from Petén were attracted to a CDC miniature light trap placed in the forest near a small reservoir. The specimens from Santa Rosa were taken while coming to humans in housing and forest areas during dusk. Howard et al. (1915) wrote, "the larvae undoubtedly live adhered to the roots of aquatic plants, much the same as *Ma. titillans*".

43. *Culex (Anoedioporpa) conservator* Dyar & Knab

Distribution: Heinemann & Belkin (1977a) reported it from IZABAL, Ruinas de Quiriguá.

Bionomics: Berlin & Belkin (1980) recorded this species breeding in tree holes and bamboo internodes in tropical areas, far from forests. Heinemann & Belkin (1977a) reported it breeding in a tree hole, associated with members of the *terrens* group of *Aedes*.

44. *Culex (Anoedioporpa) restrictor* Dyar & Knab

Distribution: BAJA VERAPAZ, Sta. Barbara, VI/25/80, 1L, MD. CHIMALTENANGO, Pochuta, Fca. Pacayal, VI/26/80, 4L, SCG. QUICHE, Km. 140 road to Chichicastenango, VII/19/80, 2L, CEA. Heinemann & Belkin (1977a) reported it from ESCUINTLA, Kms. 62.5 and 63.8; GUATEMALA, Guatemala City, Villa Canales; RETALHULEU, San Felipe.

Bionomics: Larvae were breeding in epiphytic bromeliads of the genus *Tillandsia*; they were also encountered in a tractor tire. *Culex restrictor* was associated with *Ae. quadrivittatus*, *Cx. bihaicola*, *Cx. declarator*, *Cx. erethyzonfer*, *Cx. quinquefasciatus*, and *Wy. celaenocephala*. Heinemann & Belkin (1977a) reported it in broken bamboo internodes and in tree holes, in association with *Ae. insolitus*, *Ae. podographicus*, *Ae. sandrae*, *Hg. mesodentatus*, *Ur. coatzacoalcos*, and *Wy. arthrostigma*.

45. *Culex (Carrollia) bihaicola* Dyar & Nuñez-Tovar

Distribution: CHIMALTENANGO, Pochuta, Fca. Pacayal, VI-VII/80, 12F, 8M, 6L, 3RA, RFD. Valencia (1973) reported it from ALTA VERAPAZ, Senahú.

Bionomics: This species was found in bamboo internodes and tractor tires, in association with *Ae. daryi*, *Ae. insolitus*, *Ae. homoeopus*, *Cx. bigoti*, *Cx. coronator*, *Cx. declarator*, *Cx. metempsytus*, *Cx. quinquefasciatus*, *Tx. theobaldi*, and *Ur. coatzacoalcos*. Valencia (1973) referred to it as having a great variety of breeding sites.

46. *Culex (Carrollia) metempsytus* Dyar

Distribution: CHIMALTENANGO, Pochuta, Fca. Pacayal, VI/26/80, 3L, SCG. Heinemann & Belkin (1977a) recorded it in CHIMALTENANGO, Yepocapa.

Bionomics: Larvae were collected from bamboo internodes, in association with *Ae. daryi*, *Ae. homoeopus*, *Ae. insolitus*, *Cx. bihaicola*, and *Cx. thriambus*. Valencia (1973) found that breeding sites included bamboo, tree holes, and leaves filled with water. There is no report of adults collected in nature.

47. *Culex (Culex) chidesteri* Dyar

FIRST REPORT IN GUATEMALA

Distribution: JALAPA, Km. 167, VIII/11/80, 7L, CEA. JUTIAPA, Aldea La Pava, VIII/10/80, 1L, CEA.

Bionomics: Larvae were collected from a pond containing abundant vegetation and from a drinking water pool, in association with *An. pseudopunctipennis* and *An. argyritarsis*.

48. *Culex (Culex) corniger* Theobald

Distribution: CHIMALTENANGO, Pochuta, Fcas. Pacayal and Sta. Emilia, VI/25-26/80, 12F, 18M, 5L, 4RA, SCG. JUTIAPA, Km. 87.5, Aldea Vallabajo, VIII/10/80, 1F; Km. 143, Ovejero, VIII/10/80, 1M, 1RA, CEA. QUETZALTENANGO, Salcajá, VIII/20/80, 1F, CEA. SANTA ROSA, La Avellana, VIII/80, 3F, EWC. ZACAPA, Km. 142, Estanzuela, VIII/12/80, 3L, CEA. Heinemann & Belkin (1977a) recorded it from GUATEMALA, Guatemala City and SUCHITEPEQUEZ, Mazatenango.

Bionomics: The immature stages were taken from a variety of breeding sites including tires, fountains, clay containers, swimming pools, and ground pools with turbid water. It was found only once in a bamboo internode. *Culex corniger* has been associated with many species of the genera *Culex* and *Aedes*; it has also shared its breeding sites with *An. hectoris*, *Cs. particeps*, *Ps. confinnis*, and *Tx. theobaldi*. Adults attracted to humans were captured in a housing area at dusk. Heinemann & Belkin (1977a) found it in a cement hole and in water accumulated in truck parts in association with *Cx. coronator* and *Cx. quinquefasciatus*.

49. *Culex (Culex) coronator* Dyar & Knab

Systematic Note: Bram (1967) recognized five species belonging to the *Culex coronator* complex, of which *coronator* Dyar & Knab, *usquatus* Dyar and *ousqua* Dyar are found in Guatemala. In this study, no attempt was made to distinguish among these species, and the name "*coronator*" was given to all specimens belonging to the complex.

Distribution: CHIMALTENANGO, Pochuta, Fcas. Pacayal y Sta. Emilia, VI/25-26/80, 35F, 6M, 5L, 22RA, SCG. CHIQUIMULA, El Amatillo, VIII/11/80, 1L; 8 km from Chiquimula, VIII/12/80, 7F, 1M, 6RA, CEA. GUATEMALA, Bárcenas, VIII/24/80, 2F, CEA. JALAPA, Km. 156, San Antonio Monjas, VIII/11/80, 3F, 1L, CEA. JUTIAPA, Aldea Vallabajo, VIII/10/80, 1F; Aldea El Zarzalito, VIII/10/80, 5F, 1M, 2RA; Aldea La Pava, VIII/10/80, 3F; Ovejero, VIII/10/80, 10F, 1M, 3L, 6RA, CEA. EL PROGRESO, Km. 70, VIII/13/80, 1L, CEA. RETALHULEU, San Felipe, VII/21/80, 12F, 1RA, CEA. SANTA ROSA, La Avellana, VIII/5/80, 7F, 2M, 5RA, SCG. ZACAPA, La Fragua, VIII/12/80, 4F, 1M, 1L, 4RA; Estanzuela, VIII/12/80, 1M; Llano Largo, VIII/13/80, 3F, 1M, 5L, 3RA, CEA. Heinemann & Belkin (1977a) reported it from ESCUINTLA, San José; GUATEMALA, Amatitlán, Guatemala City and Villa Canales; IZABAL, Morales, Puerto Barrios, Ruinas de Quiriguá; RETALHULEU, Champerico, San Felipe; SUCHITEPEQUEZ, Mazatenango; ZACAPA, Zacapa.

Bionomics: *Culex coronator* complex was collected from 21 breeding sites, both natural and man made. In 38% of the cases, the sites were ground pools with turbid water; in 14.3% clear-water ponds with abundant vegetation; in 47.7%, the sites were man made, for example, in water gathered in cement construction and in tires, barrels, and water inside a wooden boat. It was found associated with several species of the genera *Culex* and *Anopheles*; also with *Ae. epactius* and *Ps. confinnis*. For additional information on its ecology, consult Heinemann & Belkin (1977a).

50. *Culex (Culex) declarator* Dyar & Knab

FIRST REPORT IN GUATEMALA

Distribution: BAJA VERAPAZ, Sta. Barbara, VI/25/80, 3F, MD. CHIMALTENANGO, Pochuta, Fcas. Pacayal y Sta. Emilia, VI/25-26/80, 3L, SCG. JUTIAPA, Km. 87.5, Aldea Vallabajo, VIII/10/80, 2L, CEA. ZACAPA, Km. 143, Llano Largo, VIII/13/80, 1M, 3L, 1RA, CEA.

Bionomics: The immature stages were detected in epiphytic bromeliads of the genus *Tillandsia*, temporary ground pools, tires, and cement holes. *Culex declarator* was associated with many species of the genus *Culex* and with *Ae. quadrivittatus*, *Ae. euplocamus*, *Ae. guerrero*, and *Wy. celaenocephala*. Carpenter & La Casse (1955) reported that the adults are hard to find, and little is known of their habits (as *Cx. virgultus*). Stone (1969) reported that it was found infected with St. Louis encephalitis (SLE) virus in Trinidad.

51. *Culex (Culex) inflictus* Theobald

FIRST REPORT IN GUATEMALA

Distribution: CHIMALTENANGO, Pochuta, Fca. Pacayal, VI/26/80, 2F, SCG. JUTIAPA, Km. 87.5, Aldea Vallabajo, VIII/10/80, 1F; Km. 143, Ovejero, VII/10/80, 1F, CEA. SANTA ROSA, La Avellana, VIII/80, 1F, EWC.

Bionomics: Females alighting on humans were taken in the forest at dawn. Heinemann & Belkin (1977a) reported the species breeding in crab holes in Honduras, associated with *De. cancer*. Stone (1969) listed it in ground pools near the seashore.

52. *Culex (Culex) interrogator* Dyar & Knab

Distribution: CHIMALTENANGO, Pochuta, Fca. Pacayal, VI/26/80, 1L, SCG. JUTIAPA, Km. 107.5, Aldea La Pava, VIII/10/80, 1F; Km. 126, El Porvenir, VIII/10/80, 1L, CEA. PETEN, San Benito, VII/2/80, 1F, CHP. SANTA ROSA, La Avellana, VIII/80, 2F, EWC. ZACAPA, Estanzuela, VIII/12/80, 1F; La Fragua, VIII/12/80, 1F, CEA. Heinemann & Belkin (1977a) reported it from IZABAL, Morales.

Bionomics: The immature stages were collected from tires, clear-water ponds with abundant vegetation, and in ground pools with turbid water. They were associated with *An. pseudopunctipennis*, *Cx. coronator*, *Cx. chidesteri*, *Cx. corniger*, *Cx. quinquefasciatus*, and *Ps. confinnis*. Adults were captured coming to humans at dusk and by CDC miniature light traps in forest areas. Heinemann & Belkin (1977a) recorded *interrogator* from a small ground pool in a banana plantation, in association with *Ae. angustivittatus*, *Cx. declarator*, *Cx. mollis*, and *Cx. nigripalpus*.

53. *Culex (Culex) mollis* Dyar & Knab

Distribution: Heinemann & Belkin (1977a) recorded it from IZABAL, Morales and RETALHULEU, San Felipe.

Bionomics: Heinemann & Belkin (1977a) noted that immature stages were found in banana leaves filled with water and from ground pools in a banana plantation. *Culex mollis* was breeding with *Ae. angustivittatus*, *Cx. coronator*, *Cx. declarator*, *Cx. interrogator*, and *Cx. nigripalpus*.

54. *Culex (Culex) nigripalpus* Theobald

Distribution: PETEN, Las Cruces, VII/3/80, 1F; Fca. El Zapote, IX/8/80, 2F, CHP. SANTA ROSA, La Avellana, VIII/80, 28F, EWC. ZACAPA, Estanzuela, VIII/12/80, 2L, CEA. Heinemann & Belkin (1977a) reported it from ESCUINTLA, San José, Santa Lucia Cotzumalguapa; IZABAL, Morales, Puerto Barrios; RETALHULEU, San Felipe.

Bionomics: The immature stages were collected from a ground pool with turbid water, in association with *Cx. corniger*, *Cx. coronator*, *Cx. interrogator*, *Cx. quinquefasciatus*, and *Ps. confinnis*. Adults were taken with CDC miniature light traps placed in a forest and attracted to humans in forested and housing areas during dusk. Heinemann & Belkin (1977a) recorded immature stages from ditches and ground pools, associated with *Ae. angustivittatus*, *An. albimanus*, *Cx. declarator*, *Cx. interrogator*, *Cx. mollis*, and *Ps. confinnis*. Stone (1969) found them breeding in leaf axils and artificial containers. Adults have been collected on humans and with a net. VEE virus was recovered from *nigripalpus* in Guatemala (Sudia & Newhouse, 1975), while eastern encephalitis (EEE) and SLE viruses have been isolated from this species in Trinidad, Jamaica (Fla. State Bd. Health, 1969) and Panama (Galindo, P., per. comm.).

55. *Culex (Culex) peus* Speiser

Distribution: CHIMALTENANGO, Pochuta, Fca. Pacayal, VI/26/80, 1M, 1RA, SCG. QUETZALTENANGO, Salcajá, VII/20/80, 3F, 2L, 1RA, CEA. QUICHE, Km. 132 road to Chichicastenango, VII/19/80, 1L, CEA. SOLOLA, San Lucas Tolimán, Cerro de Oro, VIII/29/80, 3L, RFD. TOTONICAPAN, San Cristóbal, VII/20/80, 1F, 1RA, CEA. Heinemann & Belkin (1977a) reported it from GUATEMALA, Guatemala City, Villa Canales; SOLOLA, Godinez.

Bionomics: The immature stages were collected from tires, a cement swimming pool, hoof prints, a rivulet with abundant vegetation, and from a clear-water ground pool. They were associated with *An. hectoris*, *Cs. particeps*, *Cx. corniger*, *Cx. pinarocampa*, *Cx. quinquefasciatus*, and *Cx. thriambus*.

56. *Culex (Culex) pinarocampa* Dyar & Knab

Distribution: CHIMALTENANGO, Pochuta, Fca. Pacayal, VI/26/80, 2F, SCG. GUATEMALA, Puerto Parada, VII/15/80, 4F, MD. Guatemala City, VIII/80, 2F, CMG. QUICHE, Km. 132.5 road to Chichicastenango, VII/19/80, 5F, 3L, 5RA, CEA. SOLOLA, San Lucas Tolimán, Cerro de Oro, VIII/29/80, 5F, 3L, 4RA, RFD. Heinemann & Belkin (1977a) reported it from CHIMALTENANGO, Acatenango; GUATEMALA, Guatemala City; SOLOLA, Godinez.

Bionomics: This species breeds in tires, barrels, and plastic containers; they were taken once in a bamboo internode. *Culex pinarocampa* was associated with *Ae. daryi*, *Ae. homoeopus*, *Ae. insolitus*, *Cx. bihaicola*, *Cx. metempsytus*, *Cx. peus*, *Cx. quinquefasciatus*, and *Cx. thriambus*. Heinemann & Belkin (1977a) also collected it from tree and rock holes, in association with *Ae. sandrae*, *Cx. coronator*, and *Ur. coatzacoalcos*.

57. *Culex (Culex) quinquefasciatus* Say

Systematic Note: The taxonomic status of *Cx. pipiens* Linnaeus and *Cx. quinquefasciatus* Say has been questionable for a long time. *Culex quinquefasciatus* has been considered a subspecies of *Cx. pipiens*. They can only be distinguished by examining the male genitalia. Recently, Sirivanakarn (1976) and Knight (1978) have considered them as separate species. Sirivanakarn & White (1978) designated a neotype for *quinquefasciatus* and published detailed descriptions of the immature stages and the adults. In this work, we consider *quinquefasciatus* as a valid species.

Distribution: CHIMALTENANGO, Pochuta, Fca. Pacayal, VI/26/80, 3L, SCG. CHIQUIMULA, El Amatillo, VII/11/80, 5F, 3L, CEA. GUATEMALA, Guatemala City, VIII/5/80, 1F, SCG; VII/80, 1F, CEA; 6F, 1L, 4RA, CMG. JALAPA, Las Mojarritas, VII/11/80, 2L, CEA. PETEN, El Zapote, IX/8/80, 2F, CHP.

QUETZALTENANGO, Salcajá, VII/20/80, 7L, CEA. Santa Rosa, La Avellana, VII/80, 13F, EWC. SOLOLA, San Lucas Tolimán, Cerro de Oro, VIII/29/80, 6F, 10L, RFD. TOTONICAPAN, San Cristóbal, VII/20/80, 16F, 14L, 9RA, CEA. ZACAPA, Estanzuela, VIII/12/80, 1F; Llano Largo, VIII/13/80, 3F, 1L, 3RA, CEA. Heinemann & Belkin (1977a) reported it in ESCUINTLA, San José; GUATEMALA, Guatemala City; IZABAL, Morales; RETALHULEU, Champerico; SUCHITEPEQUEZ, Mazatenango.

Bionomics: The immature stages were mainly collected from artificial containers, like tires and barrels, and also in a sewage rivulet and ground pools. They were found in association with *Ae. epactius*, *An. hectoris*, *Cs. particeps*, *Cx. bihaicola*, *Cx. corniger*, *Cx. coronator*, *Cx. nigripalpus*, *Cx. peus*, *Cx. restrictor*, *Cx. thriambus*, *Ps. confinnis*, and *Tx. theobaldi*. Adults were captured coming to humans and by means of light traps. Carley (1931) stated that the breeding sites of *quinquefasciatus* are invariably situated in domestic or peridomestic areas. It was reported transmitting *Wuchereria bancrofti* in Costa Rica by Weinstock et al. (1977). James & Harwood (1979) listed this species as a vector of St. Louis encephalitis virus.

58. *Culex (Culex) stenolepis* Dyar & Knab

FIRST REPORT IN GUATEMALA

Distribution: JUTIAPA, Aldea Vallabajo, Km. 87.5, VIII/10/80, 2F, CEA.

Bionomics: Pupae were collected from a ground pool with turbid water containing abundant vegetation. It was associated with *Ae. euplocamus*, *Cx. bastagarius*, *Cx. corniger*, *Cx. coronator*, *Cx. declarator*, *Cx. educator*, *Cx. inflictus*, and *Cx. trifidus*.

59. *Culex (Culex) thriambus* Dyar

Distribution: CHIMALTENANGO, Pochuta, Fcas. Pacayal and Sta. Emilia, VI/25-26/80, 1F, 2L, 1RA, SCG. GUATEMALA, Guatemala City, VIII/80, 18F, 4RA, CMG. JUTIAPA, Aldea Vallabajo, Km. 87.5, VIII/10/80, 1L, CEA. QUICHE, Km. 132.5 road to Chichicastenango, VII/19/80, 1L, CEA. SOLOLA, San Lucas Tolimán, Cerro de Oro, VIII/29/80, 7L, RFD. Heinemann & Belkin (1977a) recorded it in GUATEMALA, Guatemala City, Villa Canales; SOLOLA, Godinez.

Bionomics: This species was taken mainly from artificial containers, such as tires, barrels, and cans and a few times from ground pools and bamboo internodes. *Culex thriambus* was associated with many species of the genus *Culex*; also with *Ae. daryi*, *Ae. epactius*, *Ae. euplocamus*, *Ae. homoeopus*, and *Tx. theobaldi*. Heinemann & Belkin (1977a) reported it in ground pools and a cement tub in association with *An. hectoris*, *Cx. coronator*, *Cx. derivator*, *Cx. peus*, and *Cx. pinarocampa*.

60. *Culex (Lutzia) bigoti* Bellardi

Distribution: CHIMALTENANGO, Pochuta, Fca. Pacayal, IX/16/80, 4F, 2M, RFD. GUATEMALA, Guatemala City, VIII/80, 7F, 5M, 10RA, CMG, SCG. Howard et al. (1915) reported it from ALTA VERAPAZ, Trece Aguas. Heinemann & Belkin (1977a) recorded it in GUATEMALA, Guatemala City.

Bionomics: The immature stages were taken from tractor and car tires and from barrels filled with water, in association with *Ae. epactius*, *Cx. corniger*, *Cx. coronator*, *Cx. inflictus*, *Cx. interrogator*, *Cx. pinarocampa*, *Tx. theobaldi*, and *Ur. coatzacoalcos*. Heinemann & Belkin (1977a) collected them from a plastic container. Howard et al. (1915) reported this species as being a predator, especially on larvae of the genera *Aedes* and *Culex*.

61. *Culex (Melanoconion) bastagarius* Dyar & Knab

FIRST REPORT IN GUATEMALA

Distribution: JUTIAPA, Km. 87.5, Aldea Vallabajo, VIII/10/80, 1F, CEA. SANTA ROSA, La Avellana, VIII/80, 4F, EWC.

Bionomics: Pupae were dipped from a ground pool with abundant herbaceous vegetation, in association with *Ae. euplocamus*, *Cx. coronator*, *Cx. declarator*, *Cx. educator*, *Cx. inflictus*, and *Cx. stenolepis*. Females were attracted to humans in swampy-forest areas during dusk. Foote (1954) reported taking immature stages from ground pools with vegetation.

62. *Culex (Melanoconion) conspirator* Dyar & Knab

Distribution: Heinemann & Belkin (1977a) reported it in IZABAL, Ruinas de Quiriguá.

Bionomics: Heinemann & Belkin (1977a) dipped immature stages from a shaded, large, clear-water ground pool with herbaceous vegetation, in association with *An. punctimacula*.

63. *Culex (Melanoconion) eastor* Dyar

Distribution: Foote (1954) reported it from GUATEMALA, no locality specified.

Bionomics: Foote (1954) collected immature stages from a swamp.

64. *Culex (Melanoconion) educator* Dyar & Knab

FIRST REPORT IN GUATEMALA

Distribution: JUTIAPA, Km. 87.5, Aldea Vallabajo, VIII/10/80, 1F, CEA.

Bionomics: Pupae were encountered in a ground pool with abundant herbaceous vegetation, in association with *Ae. euplocamus*, *Cx. bastagarius*, *Cx. coronator*, *Cx. declarator*, *Cx. inflictus*, *Cx. stenolepis*, and *Cx. trifidus*.

65. *Culex (Melanoconion) erraticus* (Dyar & Knab)

Distribution: PETEN, Tikal, VI/30/80, 1F, CHP. SANTA ROSA, La Avellana, VII-VIII/80, 12F, 1M, 3L, 2RA, EWC, SCG, CEA. Heinemann & Belkin (1977a) recorded it from IZABAL, Morales.

Bionomics: The immature stages were collected from a pond with abundant aquatic vegetation, in association with *An. albimanus*. Females were taken coming to humans in forest-swampy areas during noon, afternoon hours, and at dusk. Heinemann & Belkin (1977a) recorded it breeding in a pond with *Pistia* sp. and abundant algae, in association with *Ad. squamipennis*, *An. albimanus*, and *Ma. dyari*.

66. *Culex (Melanoconion) iolambdis* Dyar

Distribution: SANTA ROSA, La Avellana, VII/28/80, 1F, EWC. Heinemann & Belkin (1977a) reported it from GUATEMALA, Guatemala City.

Bionomics: Our only female was captured on a human in a housing area at dusk. Heinemann & Belkin (1977a) recorded immature stages from a clear-water ground pool with herbaceous vegetation situated in a domestic area, associated with *An. hectoris* and *Cx. derivator*.

67. *Culex (Melanoconion) panocossa* Dyar

FIRST REPORT IN GUATEMALA

Distribution: Sirivanakarn (1980, pers. com.) found it in SANTA ROSA, La Avellana.

Bionomics: Heinemann & Belkin (1977a) recorded this species from other Central American countries in large, clear-water ground pools with abundant floating vegetation (*Pistia*, *Salvinia*). It was incriminated as a vector of VEE in Panama (as *aikenii* Aiken & Rowland) (U.S. Dept. of Agriculture, 1973).

68. *Culex (Melanoconion) paracrybda* Komp

FIRST REPORT IN GUATEMALA

Distribution: Sirivanakarn (1980, pers. com.) reported it from SANTA ROSA, La Avellana.

Bionomics: No data available; the immature stages have not been described, except as noted above in the keys.

69. *Culex (Melanoconion) pedroi* Sirivanakarn & Belkin

FIRST REPORT IN GUATEMALA

Systematic Note: There has been much confusion about the interpretation of the species belonging to the *taeniopus* complex; see Belkin (1969), Galindo (1969), and Belkin et al. (1970). Sirivanakarn & Belkin (1980) published an important interpretation. They synonymized *opisthopus* Komp under *taeniopus* Dyar & Knab and described a new and widely distributed species, *pedroi*. Their publication includes characters that will easily separate both species. There is no doubt that *pedroi* is found in the Petén.

Distribution: PETEN, Tikal surroundings, IX/3/80, 1F; San Benito, VII/2/80, 7F; 5 km from Las Cruces, VII/3/80, 10F; Nueva Libertad, IX/4/80, 3F; Finca El Zapote, IX/8/80, 2F, CHP.

Bionomics: The *pedroi* specimens were collected with CDC miniature light traps in forest areas of Petén; no immature stages were found. Sirivanakarn & Belkin (1980) reported that *Cx. pedroi* is one of the most common *Melanoconion* species in the swampy forests of Panama. They have taken immature stages from a shaded area in a lake that had floating vegetation and roots. Evidence that *pedroi* (as *Cx. taeniopus*) is a vector of VEE and group C arboviruses is given by Galindo et al. (1966) and Galindo & Srihongse (1967).

70. *Culex (Melanoconion) pilosus* (Dyar & Knab)

Distribution: Heinemann & Belkin (1977a) reported it from GUATEMALA, Guatemala City.

Bionomics: Heinemann & Belkin (1977a) recorded immature stages from a small clear-water ground pool in a grassy area containing algae. They were associated with *Ae. angustivittatus*, *Ae. vexans*, *An. hectoris*, *Cx. coronator*, *Cx. peus*, and *Cx. thriambus*.

71. *Culex (Melanoconion) sardinerae* Fox

FIRST REPORT IN GUATEMALA

Distribution: Sirivanakarn (1980, pers. com.) reported it from SANTA ROSA, La Avellana.

Bionomics: Fox (1953) stated that in Puerto Rico, the immature stages were collected from a sewage channel; they seemed to prefer the areas by some tree trunks partially submerged in the water.

72. *Culex (Melanoconion) taeniopus* Dyar & Knab

Systematic Note: Refer to *Cx. pedroi*.

Distribution: SANTA ROSA, La Avellana, VIII/80, 21F, EWC, SCG. PETEN, Las Cruces, VII/3/80, 2F; San Benito, VII/2/80, 1F, surroundings of Tikal, IX/3/80, 1F, CHP. Cupp et al. (1979) recorded collections from SANTA ROSA, La Avellana in 1978 as *Cx. opisthopus*.

Bionomics: The specimens came from CDC miniature light traps placed in swampy-forest areas of Petén; females were also attracted to humans in forest areas during the late afternoon; no immature stages were collected. Cupp et al. (1979) have captured great numbers of adults in Guatemala with light traps, D-VAC sampling and coming to humans. Their studies in La Avellana have demonstrated that *taeniopus* (=*opisthopus*) is the vector of the enzootic strains of VEE. Galindo et al. (1966) also isolated VEE from *taeniopus* in Panama.

73. *Culex (Melanoconion) trifidus* Dyar

FIRST REPORT IN GUATEMALA

Distribution: CHIQUIMULA, Km. 211 road to Esquipulas, VIII/12/80, 1M, 1RA, CEA. JALAPA, Km. 156 to San Antonio Monjas, VIII/11/80, 6L, CEA. JUTIAPA, Km. 87.5, Aldea Vallabajo, VIII/10/80, 4L; El Zarzalito, Km. 98, VIII/10/80, 3L, CEA. SANTA ROSA, La Avellana, VII/28/80, 1F, EWC. Sirivanakarn (1980, pers. com.) collected it from SANTA ROSA, La Avellana.

Bionomics: The immature stages were found in several clear-water pools, some of which contained the algae, *Spirogyra*. *Culex trifidus* was associated with *Ae. euplocamus*, *An. argyritarsis*, *An. pseudopunctipennis*, *Cx. bastagarius*, *Cx. coronator*, *Cx. declarator*, and *Cx. educator*. The female was attracted to humans in a housing area during dusk.

74. *Culex (Micraedes) erethyzonfer* Galindo & Blanton

Distribution: BAJA VERAPAZ, Santa Barbara, VI/25/80, 2L, MD. Berlin (1969b) reported it from ALTA VERAPAZ, Senahú.

Bionomics: The larvae were collected from epiphytic bromeliads of the genus *Tillandsia*, in association with *Ae. guerrero*, *Ae. quadrivittatus*, *Cx. declarator*, *Cx. restrictor*, and *Wy. celaenocephala*. Berlin (1969b) reported it breeding in leaf axils of the family Araceae.

75. *Culex (Neoculex) derivator* Dyar & Knab

Distribution: QUETZALTENANGO, San Juan Ostuncalco, Km. 225, VII/22/80, 2F, 4M, 3RA; Palestina, VII/22/80, 2F, 2M, CEA. QUICHE, Agua Escondida, Km. 102, VII/19/80, 2L; Km. 115 road to Los Encuentros, VII/19/80, 1F, 1M, 2L, 1RA; Km. 135 road to Chichicastenango, VII/19/80, 1F, CEA. SAN MARCOS, San Antonio Sacatepéquez, VII/22/80, 3F, 1M, 4L, 3RA, CEA. Heinemann & Belkin (1977a) recorded it from GUATEMALA, Guatemala City, Villa Canales; SOLOLA, San Lucas Tolimán.

Bionomics: The immature stages were dipped from clear, cold-water pools, in association with *An. hectoris*, *An. parapunctipennis* var. *guatemalensis*, and *Cs. particeps*. A female was caught resting on some tree roots over a suspected breeding spot. Heinemann & Belkin (1977a) found them breeding in a cement pool, in association with *An. hectoris*, *Cx. iolambdis*, and *Cx. thriambus*.

76. *Culiseta (Culiseta) particeps* (Adams)

Systematic Note: Apparently, this is the first report for this species under the name *particeps* (Adams). Heinemann & Belkin (1977a) reported it as *dugesi* Dyar & Knab, but this name was synonymized under *particeps* by Stone (1958). His designation is the one used in this work.

Distribution: QUATZALTENANGO, Salcajá, VII/20/80, 5L; San Juan Ostuncalco, VII/22/80, 5F, 6M, 5RA, CEA. QUICHE, road to Chichicastenango, VII/19/80, 7L, CEA. SAN MARCOS, San Marcos, VII/22/80, 9L, CEA. TOTONICAPAN, San Cristóbal, VII/20/80, 2L; Cuatro Caminos, VII/20/80, 5L, CEA. Heinemann & Belkin (1977a) reported it from SOLOLA, Godinez and TOTONICAPAN, Totonicapán.

Bionomics: The immature stages were taken from clear, cold-water, shaded pools, garbage contaminated pools, clean rivulets with vegetation, rivulets with polluted water, a cement tub, hoof prints holding water with a high concentration of urine, and from a tire and a can containing water. They were associated with *An. hectoris*, *Cx. derivator*, *Cx. peus*, and *Cx. quinquefasciatus*. Heinemann & Belkin (1977a) recorded it from a ground pool at the roadside and in a river with abundant plants belonging to Gramineae.

77. *Deinocerites belkini* Adames

FIRST REPORT IN GUATEMALA

Distribution: SANTA ROSA, La Avellana, VIII/5/80, 5F, 3M, 7L, 6RA, CEA, RFD.

Bionomics: Larvae were aspirated from crab holes situated at the base of a leguminous tree and at the side of a brackish water channel, in association with *De. pseudes*. The tunnel to the base of the crab hole measured approximately 50 cm deep in both cases. Adults were captured flying at the entrance of the crab hole, disturbed when the siphon was introduced, and one while resting on a tree trunk in a shaded swampy area.

78. *Deinocerites cancer* Theobald

Distribution: Heinemann & Belkin (1977a) reported it from IZABAL, Puerto Barrios; Adames (1971) from IZABAL, Puerto Matías de Gálvez.

Bionomics: Adames (1971) stated that larvae occur in large crab holes surrounded by vegetation, in association with *De. epitedeus*. Although Hill & Hill (1948) reported that the adults were anthropophilic, Tempelis & Galindo (1970) have demonstrated that they prefer avian blood.

79. *Deinocerites epitedeus* (Knab)

Distribution: Same as *De. cancer*.

Bionomics: Adames (1971) recorded larvae from large crab holes surrounded by vegetation, in association with *De. cancer*. Heinemann & Belkin (1977a) noted that adults were resting on secondary vegetation growth under heavy shade.

80. *Deinocerites pseudes* Dyar & Knab

Distribution: SANTA ROSA, La Avellana, VIII/5/80, 1F, 1L, 1RA, RFD, CEA. Adames (1971) recorded it from ESCUINTLA, San José.

Bionomics: The immature stages were aspirated from 2 crab holes (see *De. belkini*). For detailed information on its ecology, consult Adames (1971).

81. *Haemagogus (Haemagogus) aeritinctus* Galindo & Trapido

Distribution: Galindo & Trapido (1967) reported it from IZABAL, Puerto Barrios.

Bionomics: Galindo & Trapido (1967) listed the species as breeding in tree holes in mangrove areas. It has only been found on the Atlantic coast at sea level. Arnell (1973) stated that it is an active biter and will take its blood meals from the head area, unlike the other species of *Haemagogus* that feed on the lower parts of the body.

82. *Haemagogus (Haemagogus) anastasionis* Dyar

Distribution: EL PROGRESO, El Rancho Desert, VII/5/80, 12F, SCG. SANTA ROSA, La Avellana, VII/25-26/80, 2F, EWC. Arnell (1973) reported it from SUCHITEPEQUEZ, Patulul.

Bionomics: Females were captured coming to humans during the morning (El Rancho) and at dusk (La Avellana). Heinemann & Belkin (1977a) reported larvae from a coconut shell. Arnell (1973) recorded secondary and deciduous forests as the usual habitat of this species in the Pacific slope of Central America. They are commonly found in tree holes but have also been encountered in bamboo internodes and husks of fruits.

83. *Haemagogus (Haemagogus) equinus* Theobald

Distribution: SANTA ROSA, La Avellana, VIII/24-26/80, 2F, EWC. Arnell (1973) reported it from ALTA VERAPAZ, Trece Aguas; ESCUINTLA, Escuintla, El Salto, San José; IZABAL, Livingston, Mojaca; RETALHULEU, Champerico; SUCHITEPEQUEZ, Patulul.

Bionomics: Adults were attracted to humans in forest and housing areas during dusk. Arnell (1973) stated that this species breeds in tree holes and bamboo internodes, usually near domestic areas. Galindo et al. (1956) confirmed that *equinus* can effectively transmit yellow fever under laboratory conditions, and Rodaniche & Galindo (1957) found naturally infected females in Guatemala. Arnell (1973) suspects that *equinus* is the actual vector of yellow fever, especially in areas where *Hg. janthinomys* Dyar is scarce or absent, as is the case in Honduras and Guatemala.

84. *Haemagogus (Haemagogus) mesodentatus* Komp & Kumm

Distribution: Arnell (1973) reported it from ESCUINTLA, El Salto; IZABAL, Rio Chiquito; JUTIAPA, Jutiapa; PETEN, no locality specified; RETALHULEU, San Felipe, San Sebastián; SUCHITEPEQUEZ, Patulul, Rio Bravo. Heinemann & Belkin (1977a) recorded it from ESCUINTLA, Santa Lucía Cotzumalguapa.

Bionomics: Heinemann & Belkin (1977a) recorded immature stages from bamboo internodes filled with water, in association with *Ae. angustivittatus*, *Ae. insolitus*, *Ae. podographicus*, *Cx. nigripalpus*, *Cx. restrictor*, *Hg. equinus*, and *Wy. arthrostigma*. Arnell (1973) stated that this species is very common in the forest areas of Petén. Although *mesodentatus* is a poor vector, it is capable of transmitting yellow fever virus with its bite (Galindo et al. 1956). The virus has been isolated from females captured in Guatemala (Rodaniche & Galindo, 1957).

85. *Haemagogus (Haemagogus) regalis* Dyar & Knab

Distribution: SANTA ROSA, La Avellana, VIII/5/80, 1F, 3M, 3RA, CEA. Howard et al. (1917) reported it from ALTA VERAPAZ, Cacao and IZABAL, Livingston. Arnell (1973) reported it in ESCUINTLA, Iztapa.

Bionomics: Larvae were taken from a tree hole with turbid water in a swampy area. Arnell (1973) also recorded it from tree holes. This species is apparently restricted to coastal, swampy areas.

86. *Johnbelkinia ulopus* (Dyar & Knab)

Distribution: Howard et al. (1915) reported it from SUCHITEPEQUEZ, Patulue (=Patulul) and Lane (1953) from GUATEMALA, no locality specified.

Bionomics: Immature stages of *ulopus* were collected during the project "Mosquitoes of Middle-America"; 80% of the samples were taken from leaf axils, 17% from *Heliconia* flower bracts, and 3% from tree holes, cacao fruits and palm spathes (Zavortink, 1979). Howard et al. (1915) reported that the larvae are predators especially on larvae of the genus *Wyeomyia*. Zavortink (1979) recorded adults alighting on humans from resting places in forest areas.

87. *Limatus durhamii* Theobald

Distribution: SUCHITEPEQUEZ, Fca. El Jardín, near Chicacao, V-X/79, III-IV/80, 12F, CHP. Heinemann & Belkin (1977a) recorded it from IZABAL, Morales, Puerto Barrios; SUCHITEPEQUEZ, Patulul.

Bionomics: Females were captured coming to humans among coffee plants. Heinemann & Belkin (1977a) reported larvae in a coconut shell and bamboo internodes.

88. *Mansonia (Mansonia) dyari* Belkin, Heinemann & Page

Distribution: SANTA ROSA, La Avellana, VIII/7/80, 1F, EWC. Heinemann & Belkin (1977a) recorded it from ESCUINTLA, Puerto San José and IZABAL, Morales.

Bionomics: The only adult captured was attracted to humans in a swampy forest area. Heinemann & Belkin (1977a) also stated that adults were taken from humans in a swampy forest area. They found immature stages in a pond in a cultivated area and from a swamp near a highway.

89. *Mansonia (Mansonia) titillans* (Walker)

Distribution: PETEN, Tikal surroundings, IX/3/80, 1F, CHP. SANTA ROSA, La Avellana, VII-VIII/80, 16F, EWC, CEA, SCG. Howard et al. (1915) reported it from ALTA VERAPAZ, Rio Polochic, Panzós, Cacao; IZABAL, Puerto Barrios. These authors erroneously listed Panzós in IZABAL.

Bionomics: Adults were collected by CDC miniature light traps placed in forest areas and coming to humans in housing and forest areas during afternoon and dusk. Belkin et al. (1970) reported that *titillans* larvae and pupae attach to the roots of aquatic plants, and their favorite host plant is water hyacinth, *Eichornia* sp. Sudia & Newhouse (1975) reported isolation of epidemic strains of VEE from *Ma. titillans* in Guatemala.

90. *Orthopodomyia kummi* Edwards

Distribution: Zavortink (1968): SOLOLA, Sololá.

Bionomics: Zavortink (1968) recorded this species breeding in tree holes, bamboo internodes, artificial containers, and an abandoned septic tank. Very little is known about the habits of adults. He claimed that they may be responsible for the transmission of viruses from wild populations of birds to domestic birds, since they feed on avian blood.

91. *Psorophora (Grabhamia) confinnis* (Lynch-Arribalzaga)

Systematic Note: Belkin et al. (1970) gave the name *columbiae* (Dyar & Knab) to the "*confinnis*" of southern United States. Because the type locality of *confinnis* (Lynch-Arribalzaga) is Argentina, the authors suggest the possibility that populations found north of the Amazon Valley belong to one or more species different from the real *confinnis*. Even so, in the present study, we will use the name *confinnis* (Lynch-Arribalzaga) for the species found in Guatemala.

Distribution: CHIQUIMULA, 8 km south of Chiquimula, VIII/12/80, 1F, CEA. JUTIAPA, Quezada, VIII/10/80, 1F, 1RA, CEA. PETEN, Nueva Libertad, IX/4/80, 2F, CHP. SANTA ROSA, La Avellana, VII/80, 3F, EWC; VIII/5/80, 3L, RFD, SCG; VIII/7/80, 1F, 3M, 1L, 4RA, RFD; VIII/24-25/80, 4F, EWC. ZACAPA, Estanzuela, VIII/12/80, 1M, CEA. Knight & Stone (1977) reported it from GUATEMALA, no locality specified.

Bionomics: The immature stages were found in a variety of habitats, ranging from tree holes to ground pools with clear and contaminated water to artificial containers like a cement tub. They were found to be associated with *Cx. coronator*, *Cx. interrogator*, *Cx. quinquefasciatus*, and *Hg. regalis*. Adults were collected in the forest with CDC miniature light traps and attracted to humans. Studies on the transmission of epidemic strains of VEE in Guatemala have shown this species to be a common vector (Sudia & Newhouse, 1975).

92. *Psorophora (Janthinosoma) albipes* (Theobald)

Distribution: SANTA ROSA, La Avellana, VIII/5/80, 1F, EWC. Heinemann & Belkin (1977a) reported it from ESCUINTLA, Iztapa; IZABAL, Morales.

Bionomics: Our only specimen was captured at dawn in the forest coming to a human. Heinemann & Belkin (1977a) recorded females alighting on humans in swampy areas during the mid-day and afternoon hours.

93. *Psorophora (Janthinosoma) champerico* (Dyar & Knab)

Distribution: Dyar & Knab (1906) designated the HOLOTYPE from RETALHULEU, Champerico.

Bionomics: Belkin et al. (1965) stated that immature stages can probably be found in temporary ground pools formed after heavy rains and river floods in forest areas.

94. *Psorophora (Janthinosoma) ferox* (Von Humboldt)

Distribution: PETEN, Tikal, VII/6/80, 1F, Nueva Libertad, IX/4/80, 1F; El Zapote, IX/8/80, 1F, CHP. SANTA ROSA, La Avellana, VIII/5/80, 1F, EWC. Howard et al. (1915) reported it from ALTA VERAPAZ, Cacao; IZABAL, Livingston. Heinemann & Belkin (1977a) recorded it in IZABAL, Morales.

Bionomics: Females were aspirated while coming to humans and trapped in forest areas during dawn and dusk. Heinemann & Belkin (1977a) stated that females attracted to humans were captured in a bamboo planting and secondary forest during noon and afternoon hours. Stone (1969) stated that larvae breed in temporary ground pools formed after heavy rains; larvae develop rapidly.

95. *Psorophora (Janthinosoma) lutzii* (Theobald)

Distribution: Howard et al. (1917) reported it from ALTA VERAPAZ, Cacao, Rio Polochic; IZABAL, Livingston, Puerto Barrios.

Bionomics: Females were attracted to humans, according to Howard et al. (1917). Nothing is known of the immature stages.

96. *Psorophora (Janthinosoma) varipes* (Coquillett)

Distribution: SANTA ROSA, La Avellana, VI-VIII/80, 6F, EWC. Heinemann & Belkin (1977a) reported it in ESCUINTLA, Iztapa. A female encountered from RETALHULEU, Champerico, is in the U.S. National Museum collection.

Bionomics: Females were captured while seeking a human host in a swampy forest area during dusk. Heinemann & Belkin (1977a) stated that females were captured in a swampy area - but during morning hours. Belkin & Heinemann (1975) suggest the possibility that the immature stages live in brackish water.

97. *Psorophora (Psorophora) ciliata* (Fabricius)

Distribution: SANTA ROSA, La Avellana, VII/1/80, 1F, EWC. Belkin et al. (1970) reported its occurrence in Central America.

Bionomics: The only female was collected in the forest during dusk coming to humans. Belkin et al. (1970) stated that the immature stages were encountered in temporary ground pools or swamp shores; larvae are predatory and develop rapidly. Females are active biters and will attack humans at any time, especially when they are near the breeding site.

98. *Psorophora (Psorophora) howardii* Coquillett

Distribution: SANTA ROSA, La Avellana, VII/4-5/80, 1F; VIII/1/80, 1F, EWC; VIII/7/80, 3F, 3L, 6RA, SCG, RFD. Heinemann & Belkin (1977a) reported it from ZACAPA, Zacapa; IZABAL, Morales.

Bionomics: Larvae were collected from hoof prints in a grassy area under shade. Females were attracted to humans during dusk and to a light trap placed in the forest. Heinemann & Belkin (1977a) recorded that larvae were breeding in a ditch near a domestic area associated with *An. albimanus*, *Cx. coronator*, and *Ps. confinnis*, and a female was resting near the breeding site.

99. *Runchomyia (Ctenogoeldia) magna* (Theobald)

Systematic Note: Zavortink (1979a,b) presented a reclassification of the genus *Trichoprosopon*, in which he subdivided the genus (sensu latu) into 4 genera: *Trichoprosopon* Theobald, *Runchomyia* Theobald, *Shannoniana* Lane & Cerqueira, and *Johnbelkinia* Zavortink. Present in the Guatemalan fauna are representatives of each of the 4 genera proposed by Zavortink. Only a detailed revision of the genus *Johnbelkinia* has been published (Zavortink, 1979a). Therefore, we can tentatively offer which species of the remaining 3 genera occur in Guatemala and their identification. This is especially true of the genus *Shannoniana* because, according to Zavortink, it is a large genus and most of the species have not yet been described.

Distribution: Howard et al. (1915) recorded it from ALTA VERAPAZ, Cacao, and Heinemann & Belkin (1977a), from IZABAL, Morales.

Bionomics: Lane (1953) reported the species breeding in the flower bracts of the genus *Celathea* and Heinemann & Belkin (1977a), in *Heliconia* leaf axils; the larvae are predaceous.

100. *Runchomyia (Isostomyia) espini* (Martini)

Systematic Note: See under *Ru. magna*.

Distribution: Heinemann & Belkin (1977a) listed it from IZABAL, Morales, Bananera.

Bionomics: Larvae were breeding in the leaf axils of the taro plant under partial shade in a domestic area.

101. *Sabethes (Sabethes) cyaneus* (Fabricius)

Distribution: Rodaniche & Galindo (1957) recorded it from IZABAL, Motagua Valley.

Bionomics: Larvae were taken from tree holes. Females exhibit diurnal feeding on humans (Dyar, 1928).

102. *Sabethes (Sabethes) tarsopus* Dyar & Knab

Distribution: Rodaniche & Galindo (1957) listed collections from IZABAL, Motagua Valley.

Bionomics: Females were reported to be anthropophilic (Dyar, 1928). Immature stages are unknown.

103. *Sabethes (Sabethoides) chloropterus* (Von Humboldt)

Distribution: CHIMALTENANGO, Pochuta, Fca. Sta. Emilia, VI/25/80, 1F, SCG. Rodaniche & Galindo (1957) recorded it from IZABAL, Motagua Valley.

Bionomics: The only female found during the project was collected in a tropical forest during the afternoon seeking a human host. Galindo et al. (1956) and Rodaniche & Galindo (1957) reported that females have been found naturally infected with yellow fever virus. Galindo (1958) stated that the species is restricted to tropical forests and jungles.

104. *Shannoniana moralesi* (Dyar & Knab)

Systematic Note: See discussion under *Ru. magna*.

Distribution: BAJA VERAPAZ, Purulhá, VII/5/80, 3F, SCG. CHIMALTENANGO, Pochuta, Fca. Sta. Emilia, VI-IX/80, 17F, SCG, OHD. SUCHITEPEQUEZ, Fca. Sta. Isabel, VI-VIII/79, 20F; Fca. Los Tarrales, IV-X/79, 19F; Fca. Los Andes, V/79, 1F, CHP. Dyar & Knab (1919) reported it from RETALHULEU, San Felipe, Fca. San Basilio (HOLOTYPE).

Bionomics: The specimens identified as *Sh. moralesi* were attracted to humans in a coffee planting and a forest during the afternoon. No immature stages were taken. Heinemann & Belkin (1977b) stated that immatures were taken from leaf axils of terrestrial aroids and flower bracts of *Heliconia* in Mexico.

105. *Toxorhynchites (Lynchiella) grandiosus* (Williston)

Distribution: Heinemann & Belkin (1977a) recorded it from GUATEMALA, Mixco.

Bionomics: Heinemann & Belkin (1977a) stated that larvae were taken from a tree hole in a fig tree, associated with *Ae. podographicus*.

106. *Toxorhynchites (Lynchiella) haemorrhoidalis superbus* (Dyar & Knab)

Distribution: Heinemann & Belkin (1977a) recorded it in IZABAL, Puerto Barrios.

Bionomics: Heinemann & Belkin (1977a) reported larvae from water accumulated in the flower bracts of *Heliconia*.

107. *Toxorhynchites (Lynchiella) theobaldi* (Dyar & Knab)

Distribution: CHIMALTENANGO, Pochuta, Fca. Pacayal, VII-IX/80, 2F, 1M, 3L, 3RA, SCG, RFD. Heinemann & Belkin (1977a) reported it (as *moctezuma* Dyar & Knab) from ESCUINTLA, Escuintla and ZACAPA, Doña María. Howard et al. (1917) recorded it from SACATEPEQUEZ, Antigua.

Bionomics: Larvae and pupae were taken from tractor tires filled with water and from a bamboo internode. They were found associated with *Cx. bigoti*, *Cx. bihaicola*, *Cx. coronator*, *Cx. corniger*, *Cx. inflictus*, *Cx. interrogator*, and *Ur. coatzacoalcos*. Heinemann & Belkin (1977a) listed larvae from tree holes, in association with *Ae. podographicus* and *Ae. sandrae*.

108. *Trichoprosopon digitatum* (Rondani)

Systematic Note: See discussion under *Ru. magna*.

Distribution: SUCHITEPEQUEZ, Chicacao, Fca. El Jardín, V/79, IV/80, 7F, CHP. Heinemann & Belkin (1977a) reported it from ALTA VERAPAZ, Senahú; IZABAL, Morales; RETALHULEU, San Francisco Zapotitlán.

Bionomics: Adults were captured in a coffee planting during morning hours coming to humans. Heinemann & Belkin (1977a) recorded immature stages from bamboo internodes and a coconut shell, in association with *Ae. impostor*, *Cx. bihaicola*, and *Wy. aporonoma*. They aspirated females attracted to humans near bamboo during the afternoon.

109. *Uranotaenia (Uranotaenia) coatzacoalcos* Dyar & Knab

Distribution: CHIMALTENANGO, Pochuta, Fca. Pacayal, VI-VII/80, 2F, 6L, SCG, RFD. GUATEMALA, Guatemala City, Zone 15, VIII/80, 2F, 7L, CMG. JALAPA, Las Mojarritas, VIII/11/80, 1L, CEA. Heinemann & Belkin (1977a) reported it from CHIMALTENANGO, Acatenango, Yepocapa; GUATEMALA, Guatemala City.

Bionomics: The immature stages were found in tires and barrels, in association with *Ae. epactius*, *Cx. bigoti*, *Cx. coronator*, *Cx. inflictus*, *Cx. quinquefasciatus*, *Cx. thriambus*, and *Tx. theobaldi*. Heinemann & Belkin (1977a) stated that immature stages were taken from artificial containers, also from rock and tree holes, associated with *Ae. homoeopus*, *Cx. coronator*, *Cx. pinarocampa*, *Cx. quinquefasciatus*, and *Cx. restrictor*.

110. *Uranotaenia (Uranotaenia) geometrica* Theobald

FIRST REPORT IN GUATEMALA

Distribution: CHIQUIMULA, Km. 205 road to Esquipulas, VIII/12/80, 2F, 4L, CEA.

Bionomics: The immature stages were dipped from a ground pool containing aquatic plants and algae under full sun, in association with *An. pseudopunctipennis*. Galindo et al. (1954) reported that larvae prefer bodies of water that are sunny and contain aquatic vegetation, particularly the alga *Spirogyra*. They are usually associated with *An. albimanus* and *An. pseudopunctipennis* and are most abundant at the end of the rainy season. Very little is known about the habits of the adults.

111. *Uranotaenia (Uranotaenia) lowii* Theobald

Distribution: PETEN, San Benito, VII/2/80, 1F, CHP. SANTA ROSA, La Avellana, VII/80, 1F, EWC. Heinemann & Belkin (1977a) recorded it from RETALHULEU, Champerico.

Bionomics: The females were obtained from light traps and D-VAC samples from a forest near La Avellana. Heinemann & Belkin (1977a) recorded immature stages in a large ground pool in a domestic area, in association with *An. albimanus* and *Cx. coronator*. Galindo et al. (1954) stated that it is common to find immature stages of *Ur. lowii* in sunny ground pools with aquatic vegetation. It is often found in association with *An. albimanus*. Females are attracted to light and have never been observed feeding on warm blooded animals.

112. *Uranotaenia (Uranotaenia) orthodoxa* Dyar

Distribution: Knight & Stone (1977) reported it from GUATEMALA, no locality specified.

Bionomics: Galindo et al. (1954) captured 6 males and 5 females with light traps in Panama; the immature stages have not been described.

113. *Uranotaenia (Uranotaenia) pulcherrima* Lynch-Arribalzaga

Distribution: Lane (1953) recorded it from GUATEMALA, no locality specified.

Bionomics: Galindo et al. (1954) captured adults with light traps in swampy areas in both Atlantic and Pacific coastlines of Panama.

114. *Uranotaenia (Uranotaenia) socialis* Theobald

Distribution: Knight & Stone (1977) reported it from GUATEMALA, no locality specified.

Bionomics: Heinemann & Belkin (1977a) stated that adults were trapped in Belize in a grassy area where cattle were feeding. In Jamaica, Belkin et al. (1970) collected immature stages from swamps, ditches, and ground pools near river banks in clear water containing algae. *Uranotaenia socialis* was found associated with *An. albimanus*.

115. *Wyeomyia (Dendromyia) aporonoma* Dyar & Knab

Distribution: BAJA VERAPAZ, Purulhá, VII/5/80, 1F, SCG. Heinemann & Belkin (1977a) recorded it in ALTA VERAPAZ, Senahú; IZABAL, Morales, Puerto Barrios.

Bionomics: We captured a female attracted to humans in a forest area during the afternoon. Heinemann & Belkin (1977a) listed that immature stages were collected from tree holes and bamboo internodes in association with *Ae. daryi*, *Ae. impostor*, *Cx. bihaicola*, *Cx. erethyzonfer*, *Li. durhamii*, *Wy. abebela*, and *Wy. arthrostigma*.

116. *Wyeomyia (Dendromyia) chalcocephala* Dyar & Knab

Distribution: Howard et al. (1915) recorded it from ALTA VERAPAZ, Trece Aguas.

Bionomics: Belkin et al. (1965) and Howard et al. (1915) reported finding larvae in water accumulated in the bracts of *Heliconia*. They were associated with *Wy. pseudopecten*.

117. *Wyeomyia (Dendromyia) pseudopecten* Dyar

Distribution: Howard et al. (1915) recorded it from ALTA VERAPAZ, Trece Aguas.

Bionomics: Same as *Wy. chalcocephala*.

118. *Wyeomyia (Wyeomyia) abebela* Dyar & Knab

Distribution: Heinemann & Belkin (1977a) reported it in ALTA VERAPAZ, Senahú.

Bionomics: Heinemann & Belkin (1977a) reported finding immature stages in water accumulated in epiphytic bromeliads, in association with *Cx. erethyzonfer*.

119. *Wyeomyia (Wyeomyia) arthrostigma* (Lutz)

Distribution: Heinemann & Belkin (1977a) recorded it from IZABAL, Morales, Puerto Barrios; RETALHULEU, San Felipe, San Sebastián; SUCHITEPEQUEZ, Rio Bravo.

Bionomics: Heinemann & Belkin (1977a) collected immature stages from bamboo internodes and *Heliconia* bracts, in association with *Ae. podographicus*, *Cx. restrictor*, *Hg. mesodentatus*, *Li. durhamii*, and *Wy. aporonoma*. Adults were alighting on humans in a bamboo grove during the afternoon.

120. *Wyeomyia (Wyeomyia) celaenocephala* Dyar & Knab

Distribution: BAJA VERAPAZ, Santa Barbara, VI/25/80, 3F, 1L, 1RA, MD; forest of Purulhá, VII/5/80, 3F, SCG. SANTA ROSA, La Avellana, VIII/80, 19F, EWC. Howard et al. (1915) recorded the HOLOTYPE from ALTA VERAPAZ, Cacao, Trece Aguas, and Heinemann & Belkin (1977a), specimens from IZABAL, Morales.

Bionomics: Immature stages were collected from epiphytic bromeliads of the genus *Tillandsia*, in association with *Ae. guerrero*, *Ae. quadrivittatus*, *Cx. declarator*, and *Cx. erethyzonfer*. Females were taken in forest and housing areas during afternoon and dusk coming to humans. Immature stages were found in terrestrial bromeliads (*Ananas*) (Heinemann & Belkin, 1977a), in association with *Wy. melanopus*. Vargas & Martínez-Palacios (1953) found it in *Heliconia* bracts.

121. *Wyeomyia (Wyeomyia) guatemala* Dyar & Knab

Systematic Note: *Wyeomyia guatemala* was considered a synonym of *mitchellii* (Theobald) by Stone et al. (1959). Bruijning (1959) placed *mitchellii* and all its synonyms under *medioalbipes* Lutz. Stone (1969) separated *guatemala* from synonymy with *medioalbipes* and considered it a valid species. He believed that it is distinct or possibly a synonym of *adelpha* Dyar & Knab. In this work, *guatemala* is treated as a valid species.

Distribution: SANTA ROSA, La Avellana, VIII/80, 3F, EWC. Howard et al. (1915) reported the HOLOTYPE from ALTA VERAPAZ, Cacao, Trece Aguas.

Bionomics: Females were taken in forest and housing areas alighting on humans during dusk. Belkin et al. (1965) agreed that it breeds in epiphytic bromeliads as reported by Vargas & Martínez-Palacios (1953) in Mexico.

122. *Wyeomyia (Wyeomyia) melanopus* Dyar

Distribution: Heinemann & Belkin (1977a) reported it from IZABAL, Morales.

Bionomics: Heinemann & Belkin (1977a) stated that immature stages were collected from terrestrial bromeliads (*Ananas*), in association with *Wy. celaenocephala*.

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INDEX TO GENERA SUBGENERA AND SPECIES

This is an alphabetical listing of the genera, subgenera and species. Page numbers in roman type refer to identification keys in English, those in old English type, to keys in Spanish. Numbers preceding the slant line (/) indicate adult female keys while those succeeding it, larval keys. Page numbers in italics pertain to data on distribution and bionomics. Generic and subgeneric abbreviations used here follow Reinert (1975).